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M E M O R A N D U M

TO: Ed Sierra, Region VI RPO

THRU: For K. H. Malone, Jr., FITOM JHM

FROM: Raymond Wayne, RW FIT Hydrologist

DATE: June 26, 1989

TDD: F068904-82
PAN: FTX0956RAA

SUBJECT: Preliminary Assessment/Environmental Priorities Initiative for the General Motors Corporation Assembly Plant Arlington, Tarrant County, TX (CERCLIS# not available)

I. Site Information

The FIT was tasked to perform a Preliminary Assessment (PA) of the General Motors Corporation (GMC) assembly site under the Environmental Priorities Initiative (EPI) of the Environmental Protection Agency (EPA). The site (Figure 1) is located at 2525 East Abram Street, Arlington, Tarrant County, Texas 76010 (Reference 1, Pages 1 and 6). The EPA assigned RCRA site identification number TXD008018004 to the facility, and the Texas Department of Water Resources (TDWR) assigned permit number 30347 (Reference 1, Page 3). Site coordinates are 32°44'56" North latitude and 97°04'19" West longitude (Reference 1, Page 7).

The site occupies approximately 250 acres on the northwest corner of East Abram Street and FM 360 (Reference 6). It is approximately one and a half miles south of Interstate Highway 30, and four miles north of Interstate Highway 20 (Reference 1, Page 6; Reference 6). The area surrounding the site is used for industrial, commercial and residential purposes (Reference 1, Attachment A).

The site is privately owned by GMC (Reference 1, Pages 1 and 2), which operates it as an automobile assembly and painting division (Reference 1, Pages 1 through 4). The facility is part of the GMC Chevrolet-Pontiac-Canada (C-P-C) Group (Reference 21, Heading). As of December 31, 1988, the net worth of GMC was $35.7 billion (Reference 2).

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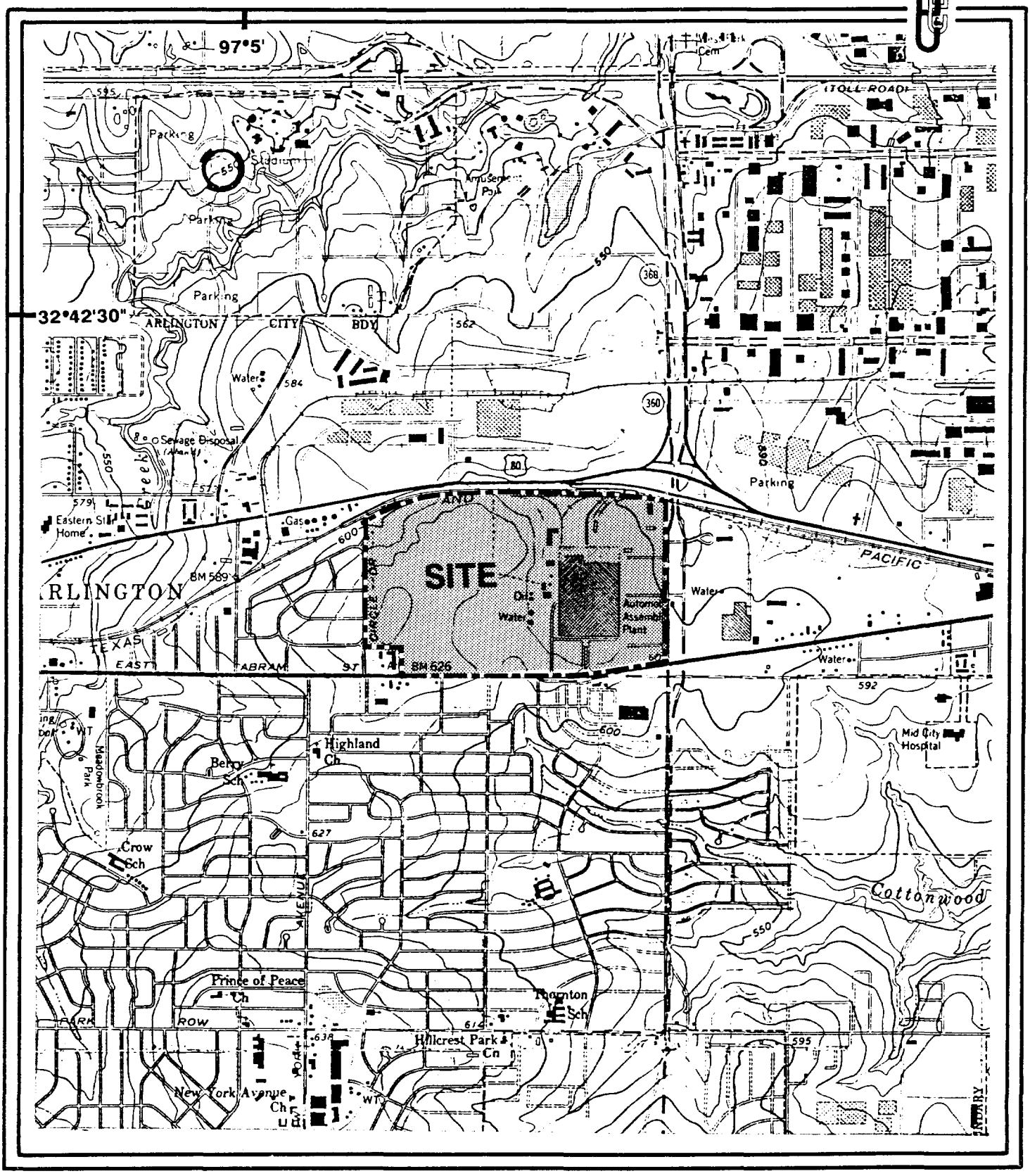

FIGURE 1

SITE LOCATION MAP

GM ASSEMBLY

ARLINGTON, TEXAS

TXD008018004

During 1988, GMC sales were $110.2 billion and total revenues were $120.4 billion (Reference 2).

II. Background/Operating History

Information on waste handling practices and other site operations was obtained from the files of EPA Region VI Superfund and RCRA in Dallas, and the Texas Water Commission (TWC) District 4 Hazardous and Solid Waste Division and Underground Storage Tank Section in Duncanville. Telephone conversations with TWC inspectors familiar with the site provided additional information.

SITE BACKGROUND

GMC has operated an automobile assembly and painting facility at the site since January 5, 1953 (Reference 35, Page 3). The facility (Figure 2) assembles pre-fabricated components and paints metallic automobile body parts (Reference 5, Page 1). Site operations involve mechanical fastening of various parts, spot and fusion welding, metal preparation prior to painting, priming and multi-layer color coating (Reference 5, Page 1; Reference 11, Page 1). Manufacturing processes include zinc phosphating, paint spraying booths and stripping systems, acetylene generators, electroplated priming, boiler system blow down, and a deionized water production system (Reference 11, Page 1).

SITE GENERATED WASTE

There are insufficient data to clearly track site-generated hazardous waste from their generation point to final disposition. Generally, wastes which are not containerized at their source for off-site disposal will enter a single wastewater flow system (Reference 11, Page 1; Reference 27). The specific system components, Solid Waste Management Units (SWMUs), are described in Section 3. The basic system consists of an industrial sewer and treatment units where wastes are removed (Reference 11, Page 1). Treatment units primarily consist of separators in which substances in the wastewater are removed and drummed for off-site disposal (Reference 11, Page 1). The final stage in the wastewater system is the permitted release of wastewater into the municipal sanitary sewer system (Reference 11, Page 1; Reference 18; Reference 26, Page 1).

Table 1 lists site-generated hazardous wastes and the off-site disposal facilities which receive the waste (Reference 27).

There is insufficient information to identify the specific compounds comprising all of the site wastes. Analytical data indicate that target compound list constituents are at the site. A 1983 sludge sample collected in a wastewater treatment unit, and analyzed using EPA protocol, showed chloroform (1,000 to 10,000 ppb), barium (855 ppm), chromium (933 ppm), nickel (487 ppm), lead (1,260 pm) and zinc (2,360 ppm) (Reference 11, Page 2, Attachment B).

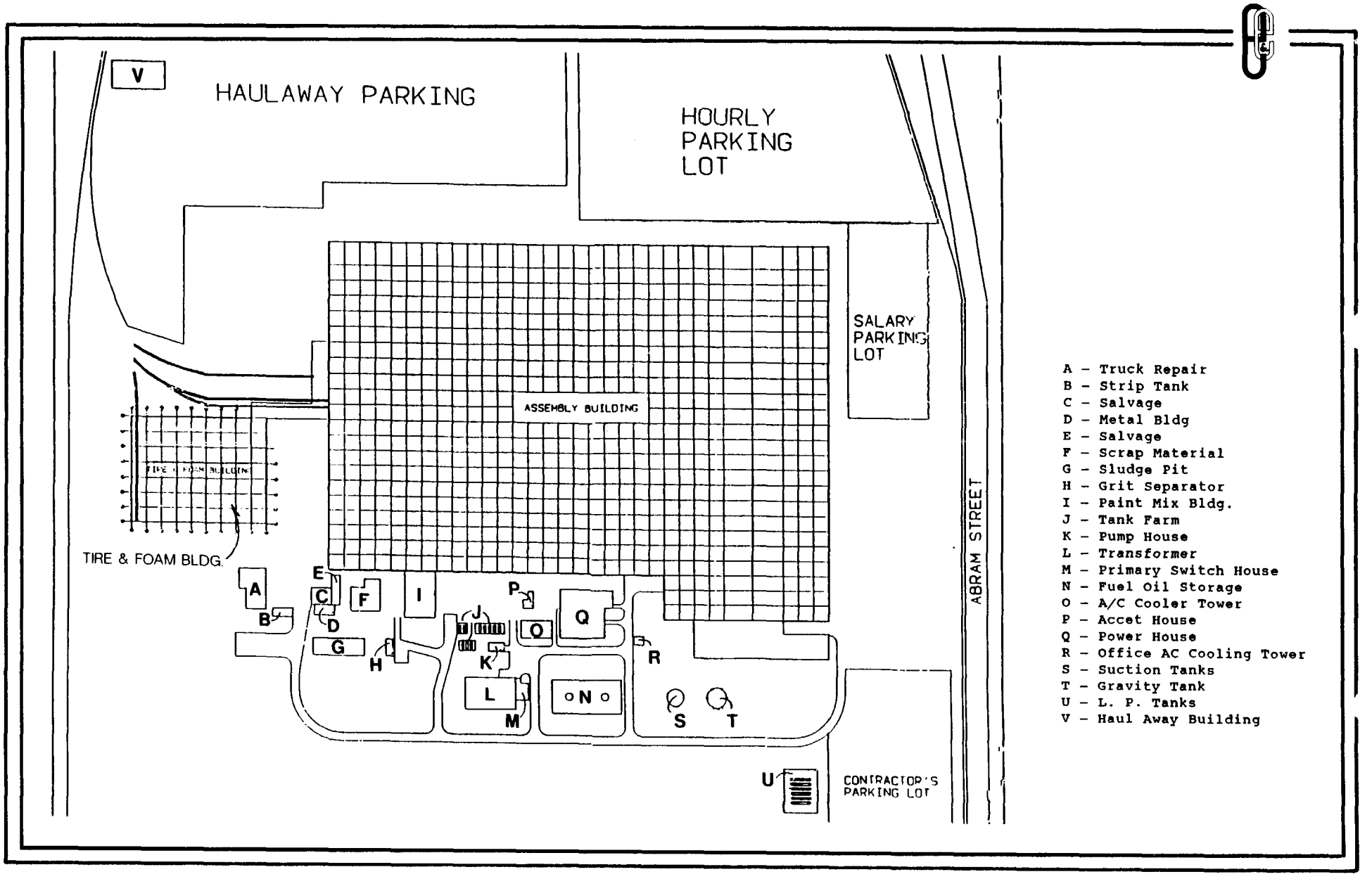

FIGURE 2
SITE SKETCH
G M ASSEMBLY
ARLINGTON, TEXAS
TXD008018004

NOT TO SCALE

Table 1. Hazadous Waste Generated at the GMC Assembly Site Arlington, Texas (TXD008018004)

Waste Type	Annual Waste Volume Generated	Waste Disposal Facility and Location
Waste Oil	7,800 gallons	La Farge Corp., Fredonia, Kansas
Paint Sludge	406 tons	USPCI, Waynoka, Oklahoma
Sodium Hydroxide	60,950 pounds	USPCI, Waynoka, Oklahoma
Plastics	78 tons	USPCI, Waynoka, Oklahoma
Paint Thinner	62,191 gallons	La Farge Corp., Fredonia, Kansas Gibralter Chemical Recyclers Winona, Texas
Paint Stripping Sludge	4 drums	La Farge Corp., Fredonia, Kansas
Asbestos Insulation	48 cubic yards (1987)	Crow and Son's Landfill, Fort Worth, Texas
Contaminated Chemical Containers	257 cubic yards	Ensco, El Dorado, Arkansas
Antifreeze	Not Known	Not Known
Industrial Waste Water (zinc phosphate and wastes listed above)	Not Known	Sanitary Sewer System, City of Arlington, Texas

Analytical data resulting from remedial action on a product spill indicated that the major constituents of the paint thinner used in site operators are toluene, xylenes, ethyl benzene and methyl ethyl ketone (Reference 5, Table II-E-2).

The site is in compliance with all hazardous waste permits (Reference 15; Reference 18; Reference 23). Current permits regulate air and wastewater releases (Reference 15; Reference 18). The facility is a 90 day generator of solid hazardous waste and does not need a RCRA Permit in order to operate (Reference 23).

The company submitted a RCRA Part A application, and requested a Part B application, because it previously operated an equalization lagoon (surface impoundment) and a drum storage area (Reference 16; Reference 27, Page 2). These were the only two RCRA-regulated units at the site (Reference 28) and were certified as properly closed by the TWC (Reference 25). The company requested that the TWC withdraw its Part A application and the request was granted on June 18, 1987 (Reference 16; Reference 19). The company did not submit the Part B application because the two RCRA-regulated units were closed (Reference 16).

EMERGENCY REMEDIAL ACTIONS

There are no documented waste spills at the site, but there were two reported product spills (Reference 10; Reference 20; Reference 21; Reference 23). On December 5, 1986, approximately 1,500 gallons of virgin paint thinner were accidentally discharged through an open valve in the Paint Mix Building (Figure 2) and flowed into a six foot deep pit west of the building (Reference 5, Page 1; Reference 20). The company recovered 250 to 350 gallons of the paint thinner (Reference 20). The remainder contaminated the soil and underlying perched ground water in the pit area (Reference 5, Page i; Reference 20). Some paint thinner constituents were detected in the ground water immediately above the Eagle Ford Shale, approximately 30 feet below land surface (Reference 5, Figure II-C-2, Table II-E-2).

A remedial plan was implemented to treat the contamination (Reference 5, Page i and ii). As part of the remedial action, a French drain, air striping system and connecting pipes were installed to treat the contaminated perched water (Reference 5, Page ii; Reference 30). The perched water treatment units are considered SWMUs.

The second known spill occurred on April 4, 1989, when mechanical failures at the facility's underground storage tank farm resulted in the release of 15,000 to 40,000 gallons of #2 fuel oil (Reference 21, p. 1). Wells in the tank farm area are producing water and fuel oil (Reference 21, p. 20). The TWC required that the company provide a site assessment report and remedial action proposal (Reference 33). At the time this PA was prepared, there was insufficient information available to identify any SWMUs associated with the fuel oil spill remedial plan.

Table 2. Suspected Solid Waste Management Units (SWMUs) at the GMC Assembly Site Arlington, Texas (TXD008018004)

SWMU #	Unit Name	Status	RCRA Unit
1	Clarifier	Active	No
2	Trade Wastewater Sewer System	Active	No
3	Grit Separator #1	Active	No
4	Grit Separator #2	Active	No
5	New Wastewater Treatment Plant	Active	No
6	Equalization Lagoon	Inactive	Yes
7	Waste Paint Thinner Tank 1	Active	No
8	Waste Paint Thinner Tank 2	Active	No
9	Roll-Off Boxes	Active	No
10	Old Drum Storage Area	Inactive	Yes
11	New Drum Storage Area	Active	No
12	French Drain System	Active	No
13	Air Stripping Tower	Active	No
14	Holding Tank and Pump	Active	No
15	Pipelines	Active	No

III. Waste Containment/Hazardous Substance Identification

There is insufficient waste handling information available to identify and characterize each SWMU at the site. The SWMUs listed in Table 2, and described in this section, provide a general view of the facility's waste stream. There is insufficient information available to determine the quantity of hazardous waste processed by each SWMU and to assess their waste containment systems. Regulatory inspectors familiar with the site indicated that the waste containment systems would prevent a release from reaching the environment (Reference 18; Reference 23).

SWMU #1 Clarifier

Wastewater from the zinc phosphating process is mixed with a caustic agent to raise the pH and a flocculent polymer to promote the settling of solids (Reference 11, p. 1). Clarifiers are usually tanks, but there is no documentation pertaining to the structure or location of this unit. The solids (sludges) which settle are drummed for off-site disposal and the liquid discharged into the facility's trade wastewater sewer system (Reference 11, p. 1).

SWMU #2 Trade Wastewater Sewer System

The trade wastewater sewer system collects wastewater from various industrial work areas on-site (Reference 27, p. 1). The wastewater includes spent zinc phosphate solution, and washwater from the paint spraying and other process areas (Reference 27, p. 1). Wastewater flows through the sewer system and discharges into grit separators (Reference 1, Attachment G; Reference 11, p. 1).

The locations of the sewer line and inflow drains are not known. A 12 inch sewer line runs north for approximately 130 feet approximately 15 feet west of the Paint Mix building west ramp (Figure 2) and discharges into a grit separator (Reference 5, p. 14). A second sewer line runs from the Paint Mix building west to the first sewer (Reference 5, p. 14). The drains to the second sewer have been plugged (Reference 5, p. 14). All industrial wastewater sewer lines connecting process areas to the treatment units are considered one SWMU.

SWMUs #3 and #4 Grit Separators

The grit separators are two 10,000-gallon, open top tanks which receive wastewater from the trade wastewater sewer system (Reference 11, p. 1). The tanks have skimmers that remove surface substances and drag bars that remove sludges from the tank bottom (Reference 11, p. 10). Whether the wastewater enters both tanks, or divides between the tanks, is not known. The removed substances are drummed for off-site disposal and the remaining wastewater is pumped to a new wastewater treatment plant (Reference 11, p. 1).

SWMU #5 New Wastewater Treatment Plant

The new treatment plant has been in operation for approximately three years (Reference 26, p. 1). The unit is the last on-site stage of wastewater treatment (Reference 26, p. 1). Sludges and filter backwash cake are collected and disposed off-site (Reference 26, p. 1). The treated wastewater from the unit is discharged into the Arlington municipal sanitary sewer system (Reference 18; Reference 26, p. 1). Specific unit structures and operations are not known.

SWMU #6 Equalization Lagoon

The equalization lagoon (Figure 3) was a surface impoundment with a capacity of approximately 630,000 gallons (Reference 11, p. 2). The lagoon served as the final trade wastewater treatment unit from 1954 to 1985 (Reference 11, p. 2, Page 1 of Section B). The unit was a one compartment, earthen lagoon from 1954 to 1965 (Reference 11, Page 2). In 1965, the walls and bottom of the lagoon were lined with reinforced concrete and divided by a dam into two compartments (Reference 11, Page 2). Trade wastewater entered the primary compartment (475,000 gallons) where solids settled by gravity separation (Reference 11, Page 2). Holes in the dam allowed the wastewater to enter the secondary compartment (155,000 gallons) for additional settling (Reference 11, Page 2). A sump at the outflow end of the secondary compartment allowed overflow to gravity-feed into the municipal sanitary sewer system (Reference 11, Pages 1 and 20). In 1985, the lagoon was properly closed and replaced by the new trade wastewater treatment unit (SWMU 5) (Reference 11, Section B; Reference 25, Page 1).

During normal operations, the accumulated lagoon sludge was removed annually and transported off-site for disposal in an approved landfill (Reference 11, Page 2). The lagoon sludge contained barium, chloroform, chromium, lead, nickel and zinc, and was classified as a hazardous waste (EPA waste identification number F006) (Reference 11, Page 2, Attachment B). The lagoon was a RCRA regulated unit (Reference 28).

SWMUs #7 and #8 Waste Paint Thinner Tanks 1 and 2

Two 12,000 gallon tanks are in the Paint Mix building and are used to store waste paint thinner (Reference 27, Page 1; Reference 28; Reference 29, Pages 2 and 4). The thinner was used to clean paint lines (Reference 27, Page 1; Reference 28). One tank (SWMU 7) contains paint thinner too contaminated with paint to be reclaimed, and the second tank (SWMU 8) contains contaminated paint thinner which can be reclaimed (Reference 27, Page 1). The contents of each tank are manifested to an off-site facility (Reference 11, Page 2).

SWMU #9 Roll-Off Boxes

Roll-off (wheeled) boxes at the site are used to store contaminated containers and liners (Reference 29, Pages 3 and 4). The TWC does not

require that records for storage, processing and disposal of this waste be maintained (Reference 29, Page 4). No additional reference for the roll-off boxes was available.

SWMU #10 Old Drum Storage Area

The old drum storage area (Figure 3) was used to store site-generated hazardous and non-hazardous wastes (Reference 24, Page 2 of Attachment A). The unit operated between 1954 and 1985 (Reference 1, Page 14; Reference 26, Page 1). The storage area consisted of an uncovered, curbed, concrete slab with an approximately 7,000 square-foot area (Reference 1, Page 14). The design capacity of the unit was 92,400 gallons, but the estimated maximum storage was 1,000 55 gallon drums with a normal inventory of 50 to 250 drums (Reference 1, Page 14; Reference 24, Page 2 of Attachment A). Hazardous wastes stored at the unit include paint sludge (EPA waste identification numbers D004, D008), waste plastics (D001), salt bath sludge (D002, D007), and waste paint and thinner (D001) (Reference 24, Page 2 of Attachment A).

The old drum storage area was a RCRA-regulated unit (Reference 28). The company closed the unit so it could withdraw its RCRA Part A application (Reference 28).

SWMU #11 New Drum Storage Area

The new drum storage area (Figure 3) is diked and fenced and is located on the site of the closed equalization lagoon (SWMU 6) (Reference 24, Attachment A-1; Reference 26, Page 1). The unit was opened at approximately the same time as the old drum storage area (SWMU 10) was closed (Reference 28).

This unit is a 90 day container storage area which receives site-generated wastes (Reference 23). Site wastes stored at the unit include waste oil, paint sludge (D008), paint stripping (D001, F002) sodium hydroxide (D002, D005, D008), plastics (D001), paint thinner (D001, F003) asbestos insulation, zinc phosphate bath sludge, containers, antifreeze, demineralized resin beads, alcohols (D001) and filter wastes (D008) (Reference 29, Page 2 and 4). The dimensions of the unit are not known.

SWMU #12 French Drain System

The French drain system is located west of the Paint Mix building (Figure 4) and is used to recover spilled paint thinner from the contaminated perched water zone (Reference 5, Pages i and 33, Figure IV-A-1). The drain occupies 120 cubic feet (100 feet x 3 feet x 4 feet) (Reference 5, Page 33). The unit includes a sump and sump pump to transfer the contaminated water to an air stripping tower (Reference 5, Page 33). Major constituents identified in the contaminated perched water, and treated by the unit, are toluene, xylenes, ethyl benzene,

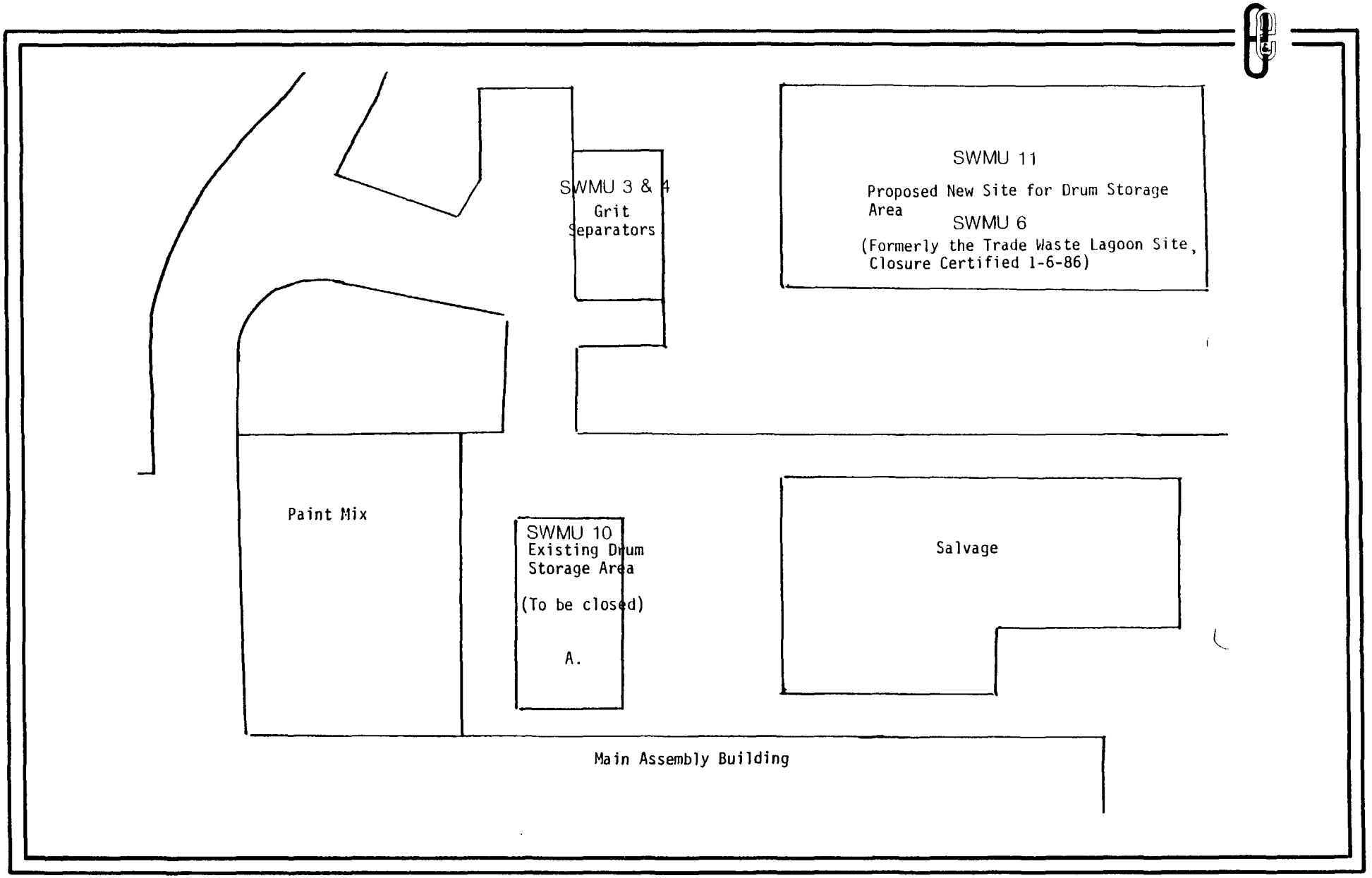

FIGURE 3
SITE SKETCH OF THE DRUM STORAGE AREAS
G M ASSEMBLY
ARLINGTON, TEXAS
TXD008018004

NOT TO SCALE

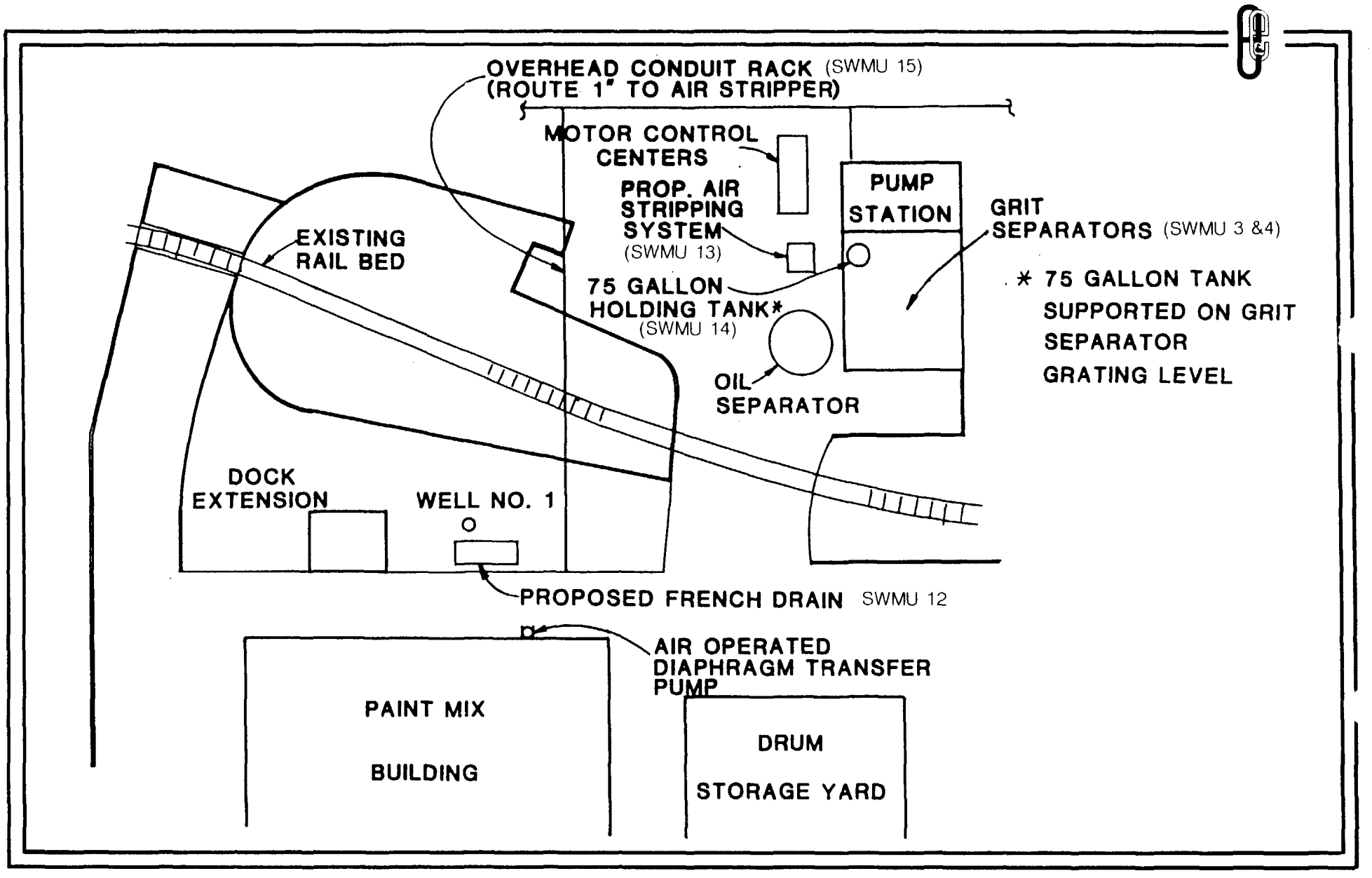

FIGURE 4
AIR STRIPPER SYSTEM LAYOUT
G M ASSEMBLY
ARLINGTON, TEXAS
TXD008018004

NOT TO SCALE

methyl ethyl ketone and chloroform (Reference 5, Table II-E-2). The system became operational in September 1987 (Reference 30).

SWMU #13 Air Stripping Tower

The tower receives contaminated water from the french drain system (SWMU 12) (Reference 5, Page 33). Contaminated water flows downward in the tower as air is blown upward (Reference 5, Pages 22 through 25, 33). Volatile organic compounds are removed from the water and vented out of the tower with the air (Reference 5, Pages 22 through 25). The dimensions of the stripping tower are not known. The tower became operational in September 1987 (Reference 30).

SWMU #14 Holding Tank and Pump

A 75 gallon holding tank and circulation pump located near the air stripping tower (SWMU 13) (Figure 4) receives the tower outflow water (Reference 5, Page 33). The pump recirculates the water into the top of the air stripping tower for additional treatments (Reference 5, Page 33). The discharge from the air stripper will flow to the new wastewater treatment unit (SWMU 5) when the air stripping treatment is completed (Reference 5, Page 33). The tank became operational along with the French drain and air stripping tower in September 1987 (Reference 30).

SWMU #15 Pipelines

Pipes transfer the contaminated perched water between the treatment units (SWMUs 5, 12, 13 and 14) (Reference 5, Page 33). The connecting spilled paint thinner remedial units are considered one SWMU.

IV. Pathway Characteristics

This section examines the potential for contaminant migration from the site via the air, ground water, surface water and on-site pathways.

A. Air Pathway Characteristics

Several SWMUs are potential sources of air route contaminant migration. Air migration is the designed purpose of the air stripping tower (SWMU 13) (Reference 5, Pages 22 through 25). Volatile organic compounds are removed from the contaminated water in the air stripper and released to the atmosphere (Reference 5, Pages 22 through 25). The two grit separators (SWMUs 3 and 4) are open top tanks in which compounds less dense than water migrate to the water surface and are skimmed off (Reference 11, Page 1). There is insufficient information available to characterize the air migration pathway from the other waste handling units.

The prevailing wind in Tarrant County is from the south and attains a maximum average velocity (14 miles per hour) in March and April

(Reference 34, Page 3). The average temperature is 83°F (daily average maximum of 94°F) in summer and 47°F (daily average minimum of 37°F) in winter (Reference 34, Page 3). The total annual precipitation is 32.1 inches, with 59 percent usually falling between April and September (Reference 34, Page 3). The average relative humidity is approximately 81 percent at dawn and approximately 55 percent in mid-afternoon (Reference 34, Page 3). The sun shines approximately 76 percent of the time in summer and approximately 55 percent of the time in winter (Reference 34, Page 3).

B. Ground Water Pathway

The site is underlain by one to two feet of fill material (Reference 5, Page 5). Fill material is considered urban land by the Soil Conservation Service, which does not provide a classification for the soil type (Reference 34, Page 57, Sheets 33 and 39). Directly beneath the fill is a 30 to 40 foot thick layer of tan and gray silty clay (Reference 5, Page 5). The silty clay contains intermittent vertical limestone and siltstone seams extending to ten feet deep (Reference 5, Page 5). A perched water zone was identified at approximately the depth of the fill and silty clay interface (Reference 5, Page 5).

The Eagle Ford Group underlies the silty clay and is approximately 100 feet thick (Reference 5, Page 3). The Eagle Ford consists of shale, limestone, clay and marl, and produces only small amount of water in localized areas (Reference 5, Page 3). Ground water was encountered on-site just above the Eagle Ford Group, approximately 30 feet below land surface (Reference 5, Page 5, Figure 11-C-2).

The Woodbine Group underlies the Eagle Ford, and is approximately 300 feet thick (Reference 5, Page 3). The Woodbine is composed of fine-grained sand and sandstone with interbedded shale, sandy shale and laminated clay, with the lower portion having a larger sand content (Reference 5, Page 3). Within four miles of the site, there are no known discontinuities in either the Woodbine or overlying units (Reference 9, Figure 17).

The Woodbine is an aquifer which generally produces good quality water (total dissolved solids less than 500 mg/l) (Reference 5, Page 5). Hydraulic conductivity in the Woodbine is 10^{-3} to 10^{-2} cm/sec (reference 9, Page 47). Regionally, ground water flows toward the east southeast at approximately 15 feet per year (Reference 9, Page 46). The Woodbine is recharged by rainfall on the outcrop area, which runs north and south from Cleburne through west Arlington to Denton (Reference 5, Page 5). The net precipitation at the site is negative 24 inches (Reference 8, Figures 4 and 5).

C. Surface Water Characteristics

There is no surface water runoff, or flood pathway from the site. The runoff from all waste process areas flows into the trade wastewater

treatment system and is discharged into the Arlington municipal sanitary sewer system (Reference 18). All non-process area runoff enters the Arlington municipal storm water sewer system (Reference 18). Government regulatory officials indicated that the site has sufficient containment structures to prevent a release to the environment through the surface water pathway route (Reference 18; Reference 23).

The 2 year, 24 hour rainfall is 3.85 inches, but the entire site is located above the 500-year floodplain (Reference 4; Reference 7).

D. On-Site Pathway Characteristics

Access to the site is controlled by a security fence and security guards. The security system is reported to be effective. There is a separate security fence around the new drum storage area (Reference 10).

V. Targets

This section identifies targets for the air, ground water, surface water and on-site populations.

Air

Within four miles of the site, land use is primarily industrial, commercial or residential (Reference 1, Attachments A and B). Approximately 1,300 people live within a quarter mile of the site, 14,400 within one mile, and 131,800 within four miles (Reference 30). The number of people residing beyond the site's four mile radius, who work or attend institutions within the four mile radius, is not known.

There are no critical habitats for a federally listed endangered species within four miles of the site (Reference 14; Reference 31). It is not known whether there are sensitive environments within four miles of the site (Reference 14; Reference 31).

Ground Water

There is no known ground water usage from extraction points located within four miles of the site (Reference 12; Reference 13; Reference 17). Drinking water is supplied to the entire area within four miles of the site by either the Arlington Water Department, or the Grand Prairie Water Department (Reference 12; Reference 13). Both municipal utilities obtain water from sources outside the site area (Reference 12; Reference 13). There is no agricultural usage of ground water within four miles of the site (Reference 13; Reference 17).

C. Surface Water

There is no surface water target population because the site is not in a floodplain and all site runoff flows into the Arlington municipal sewer system (Reference 4; Reference 5, Page 3; Reference 18).

D. On-Site

The facility has approximately 4,000 employees. There is not an on-site residential population (Reference 10; Reference 32). The near-site residential population is approximately 1,300 within a quarter mile, 3,800 within a half mile, and 14,400 within one mile (Reference 30).

Within one mile of the site, there are single and multiple family residents, schools, parks (public and private) and a hospital (Reference 1, Attachments A and B; Reference 6; Reference 10). There are no known critical habitats for a federally listed endangered species, or sensitive environments, within one mile of the site (Reference 14; Reference 31).

VI. Conclusions

The GMC site has been assembling and painting automobiles for approximately 40 years. Information regarding waste handling practices is insufficient to identify and characterize all of the SWMUs at the site.

Available information indicates that all hazardous wastes are either drummed at their source and disposed off-site, or enter a trade wastewater treatment system. During treatment, gravity induced separation of compounds is used to remove hazardous wastes. The removed wastes are drummed for off-site disposal and the wastewater is released to the Arlington municipal sewer system. All drummed waste is manifested from the site within 90 days of generation. The site contains no active RCRA regulated units.

Recent product spills have contaminated the shallow ground water and remedial actions are underway. There are no known ground water usages near the site. All site surface water runoff flows into municipal sewers.

General Motors Corporation Assembly

References

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02	The Value Line Investment Survey, Part 3 Ratings & Reports. Value Line, Inc., New York, New York. March 24, 1989.
03	1980 Census of Population and Housing, Census Tracts, Dallas - Fort Worth, Texas. U.S. Department of Commerce, Bureau of the Census.
04	Record of Communication. To: Rene Del Rosa, Secretary, Flood Plain Management Office, United States Army Corp. of Engineers, Fort Worth, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 23, 1989.
05	Interim Remedial Action Plan, General Motors Corporation CPC Division, Arlington, Texas. Prepared by: HDR Infrastructure, A Centerra Company. March, 1987.
06	U.S.G.S. 7.5 Minute Series Topographic Maps. Quadrangles: Arlington, TX. (1959, photorevised 1968 and 1973); Duncanville, TX (1959), photorevised 1981; Euless, TX (1959, photorevised 1968 and 1973); Hurst, TX 1959, photorevised 1981); Irving, TX 1959, photorevised 1981); and Kennedale, TX (1959, photorevised 1968 and 1973).
07	Herschfield, D. M. Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.
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09	Nordstrom, Phillip L. Report 269, Occurrence, Availability, and Chemical Quality of Ground Water In The Cretaceous Aquifers of North-Central Texas, Volume 1. Texas Department of Water Sources. Austin, Texas. April, 1982.
10	Record of Communication. To: Tim Sewell, Environmental Quality Specialist, Texas Water Commission, Duncanville, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 24, 1989.

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Reference Number	Description of the Reference
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12	Record of Communication. To: John Wankum, Utility Engineer, Water Department, City of Arlington, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 24, 1989.
13	Record of Communication. To: Wilburn White, Utility Supervisor, Water Department, City of Grand Prairie, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 24, 1989.
14	Record of Communication. To: Joe Johnston, Biologist, Ecological Services, United States Fish & Wildlife Service, Fort Worth, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 25, 1989.
15	Record of Communication. To: Eddy Mack, Engineering Assistant, Texas Air Control Board, Region 8, Fort Worth, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 24, 1989.
16	Record of Communication. To: Wilma Stevenson, Administrative Technician, Information and Technical Services, Texas Water Commission, Austin, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 5, 1989.
17	Record of Communication. To: Sid Ricks, Conservation Officer, United States Soil Conservation Service, Fort Worth, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 25, 1989.
18	Record of Communication. To: Craig Powell, Senior Pollution Control Officer, Water Department, City of Arlington, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 25, 1989.
19	Letter. To: D. W. Tunstall, General Motors Corporation, Arlington, Texas. From: Russel S. Kimble, Chief, Reports and Management Section, Hazardous and Solid Waste Division, Texas Water Commission, Austin, Texas. June 18, 1987.
20	Letter. To: Texas Water Commission, District 4, Duncanville, Texas. From: Ron Lee, Personnel Director, CPC Arlington, General Motors Corporation, Arlington, Texas. December 15, 1986.

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Reference Number	Description of the Reference
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24	Letter. To: Minor Hibbs, Texas Water Commission, Austin, Texas. From: Kent Moon, Environmental Engineer, CPC Arlington, General Motors Corporation, Arlington, Texas. September 16, 1986.
25	Letter. To: Gary Giles, General Motors Corporation, Arlington, Texas. From: Minor Brooks Hibbs, Chief, Permits Section, Hazardous and Solid Waste Division, Texas Water Commission, Austin, Texas. September 26, 1986.
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29	Texas Water Commission, Notice of Registration, Solid Waste Management. For: General Motors Corporation, 2525 East Abram Street, Arlington, Texas. April 4, 1989.
30	Letter. Tim Sewell, Texas Water Commission, Duncanville, Texas. From: Paul Caigoy, Industrial Hygienist, CPC Arlington, General Motors Corporation, Arlington, Texas. September 23, 1987.
31	Record of Communication. To: Gary Tarpley, District Supervisor, Texas Parks and Wildlife, Fort Worth, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. May 25, 1989.

General Motors Corporation Assembly

References

Reference Number	Description of the Reference
32	Record of Communication. To: Deborah Edris, Secretary, Chamber of Commerce, Arlington, Texas. From: Raymond Wayne, FIT Hydrologist. EPA Region VI. June 5, 1989.
33	Letter. To: Joanne Pritcher, Environmental Supervisor, General Motors Corporation, Arlington, Texas. From: Keith Copeland, Head, Corrective Action Unit, Underground Storage Tank Section, Texas Water Commission, Austin, Texas. April 13, 1989.
34	Soil Survey of Tarrant County, Texas. United States Department of Agriculture Soil Conservation Service. June, 1981.
35	Hazardous Waste Permit. United States Environmental Protection Agency, Consolidated Permits Program. Form 1, General Information; Form 3, Hazardous Waste Permit Application. Completed by: GMC GM Assembly Division Arlington Plant, Arlington, Texas. November 17, 1980.

TEXAS DEPARTMENT OF WATER RESOURCES

PERMIT APPLICATION
FOR
INDUSTRIAL SOLID WASTE STORAGE/PROCESSING/DISPOSAL FACILITY

PART I - FACILITY BACKGROUND INFORMATION

I. GENERAL INFORMATION

A. Applicant: GENERAL MOTORS ASSEMBLY DIVISION
(Individual, Corporation, or Other Legal Entity Name)

Address: 2525 EAST ABRAM

City: ARLINGTON State: TEXAS Zip Code: 76010

Telephone Number: 817/ 649-6351

B. Authorized Agents

1. List those persons or firms authorized to act for the applicant during the processing of the permit application. Also indicate the capacity in which each person may represent the applicant (engineering, legal, etc.). The person listed first will be the primary recipient of correspondence regarding this application. Include the complete mailing addresses and phone numbers.

RONALD A. MILLER, PLANT ENGINEER
GENERAL MOTORS ASSEMBLY DIVISION
2525 EAST ABRAM
ARLINGTON, TEXAS 76010

C. [illegible]

RONALD A. MILLER, PLANT ENGINEER

2525 EAST ABRAM

ARLINGTON TEXAS 76010

Telephone Number: 817/ 649-6351

(a) The applicant's authorized agent for service

Name: SAME AS APPLICANT

Address: SAME AS APPLICANT

Zip Code:

Telephone Number:

(b) Operator. Identify the entity who will conduct facility operations.

If same as applicant, state: same as applicant

Name: SAME AS APPLICANT

Address: SAME AS APPLICANT

City: State: Zip Code:

Telephone Number:

(c) Ownership

(1) (A) The ownership status of the facility:

Corporation

Partnership

Proprietorship

Non-profit organization

(B) If:

(i)

(ii)

(iii)

(iv)

a. Submit as an attachment a copy of the lease for use of said facility and/or site property, as appropriate, and

b. Identify the facility owner. If same as applicant in Part A above, state "same as applicant." If different from the applicant, please note that the owner is required to sign the application on page 5.

Name: SAME AS APPLICANT

Address: _____

City: _____ State: _____ Zip Code: _____

Telephone Number: _____

E. Type of Permit Application:

1. New _____

2. Amendment X (TDWR Permit Number: 30347)

F. Registration and Permit Information

1. Denote your TDWR Solid Waste Registration Number. If none, state "none."

30347

2. Indicate by listing the permit number(s) in the appropriate column below all existing or pending State and/or Federal permits or construction approvals which pertain to pollution control or industrial solid waste management activities conducted by your plant or at your location. Complete each blank by entering the permit number, or the date of application, or "none".

Relevant Program and/or Law	Permit No.	Government Agency
a. Texas Solid Waste Disposal Act	30347	TDWR
b. Wastewater disposal under the Texas Water Code		
c. Underground injection under the Texas Water Code		
d. Texas Clean Air Act		
e. Texas Uranium Surface Mining & Reclamation Act		
f. Texas Surface Coal Mining & Reclamation Act		
g. Hazardous Waste Management program under the Resource Conservation and Recovery Act	TXD008018004	EPA

h. UIC program under the Safe Drinking Water Act _____ _____

i. NPDES program under the Clean Water Act _____ _____

j. PSD program under the Clean Air Act _____ _____

k. Nonattainment program under the Clean Air Act _____ _____

l. National Emission Standards for Hazardous Pollutants (NESHAPS) preconstruction approval under the Clean Air Act _____ _____

m. Ocean dumping permits under the Marine Protection Research and Sanctuaries Act _____ _____

n. Dredge or fill permits under section 404 of the Clean Water Act _____ _____

o. Other relevant environmental permits _____ _____

* Use the following acronyms for each agency as shown below:

TDWR = Texas Department of Water Resources
TACB = Texas Air Control Board
TRC = Texas Railroad Commission
TDH = Texas Department of Health
TDA = Texas Department of Agriculture
EPA = U. S. Environmental Protection Agency
CORPS = U. S. Army Corps of Engineers

6. Description of Business

a. Give a brief description of the nature of your business.

ASSEMBLY AND FINISH PAINTING OF AUTOMOBILES

b. List the principal products and/or services which are provided by your plant(s). Please itemize by standard Industrial Classification (SIC) codes.

3711 TRANSPORTATION MANUFACTURERS

II. SITE BACKGROUND INFORMATION

A. Location of Site

1. Facility Name: GENERAL MOTORS ASSEMBLY DIVISION

Street Address, if available: 2525 EAST ABRAM

ARLINGTON, TEXAS County: TARRANT

2. Are your waste management operations within the extraterritorial jurisdiction of a municipality?

X Yes ____ No

If you checked "yes," what municipality? ARLINGTON

3. Give a verbal description of the location of the facility site with respect to known or easily identifiable landmarks.
APPROXIMATELY ONE AND ONE QUARTER MILES SOUTH OF SIX FLAGS OVER TEXAS AMUSEMENT PARK

4. Detail the access routes from the nearest U.S. or State Highway to the facility site.
AT INTERSECTION OF FM 360 AND EAST ABRAM, APPROXIMATELY ONE AND ONE HALF MILES SOUTH OF I-30 AND FOUR MILES NORTH OF I-20

5. Submit as "Attachment A" a United States Geological Survey (USGS) 7½ minute quadrangle map, indicate on this map the location of the site and the land use patterns of the areas within 1 mile (1.6 km) of the site boundaries (e.g., residential, commercial, recreational, agricultural, undeveloped, etc.). Each area of land use should be labeled on the map. (Note: If such a map is not available, submit a substitute map such as a State Department of Highways and Public Transportation county map with sufficient scale to adequately show the site location and surrounding land use patterns.)

Submit as "Attachment B" a map indicating the boundaries of all adjacent parcels of land and a list of the names and mailing addresses of all adjacent landowners and other nearby landowners who might consider themselves affected by the activities described by this application. Cross-reference this list to the map through the use of appropriate keying techniques. The map should be a USGS map, a city or county plat, or another map or drawing with a scale adequate enough to show the cross-referenced affected landowners.

b. Indicate from what source(s) the names and addresses of persons identified as affected were obtained:

City _____
County _____
School District _____
Water District _____
Abstract Co. _____
Other (specify) Phone book

7. Enter the geographical coordinates of the site:

Latitude 32 deg 44 min 56 sec

Longitude 97 deg 04 min 19 sec

8. Is the facility located on Indian lands? Check one:

____ Yes X No

B. Legal Description of Site

Submit as "Attachment C" a legal description of the entire tract of land upon which the waste management operations referred to in this permit application occur or will occur.

C. Site Environmental and Technical Information

1. Climatic and Hydrologic

a. Is any portion of your waste management facility site (including proposed, active, and inactive portions) subject to flooding from adjacent or nearby surface water bodies under the following conditions:

24-hr. Rainfall Event	Yes	No
25-year	____	X
100-year	____	X
Other	____	X

b. Are there any producing groundwater wells on your site property?

____ Yes X No

If you checked "Yes":

(1) Indicate the number of such wells _____ and

(2) Indicate the corresponding water uses below:

(a) Industrial uses:
Cooling water _____
Process water _____
Fire-control water _____

(b) Potable (drinking) water _____

(c) Agricultural uses:
Irrigation water for livestock food crops or grazing land _____
Livestock watering _____
Irrigation water for human food crops _____

c. Are any adjacent or nearby surface waters utilized by the applicant?

_____ Yes _X_ No

If you checked "yes," indicate the corresponding water uses below:

(1) Industrial uses:
Cooling water _____
Process water _____
Fire-control water _____

(2) Potable (drinking) water _____

(3) Agricultural uses:
Irrigation water for livestock food crops or grazing land _____
Livestock watering _____
Irrigation water for human food crops _____

2. Site Land Use and Subsidence Information

a. Is any portion of the overall site property utilized for agricultural purposes?

_____ Yes _X_ No

If you checked "yes," indicate the corresponding uses below:

(1) Crops:
(2) Livestock food crops _____
(3) Human food crops _____

If you checked (2) or (3), specify the types of crops grown: _____

b. Is any portion of the overall site property subject to land subsidence?

_____ Yes _X_ No

3. If you checked "yes," estimate the magnitude of the greatest subsidence that has occurred (in units of feet). _____

III. WASTES AND WASTE MANAGEMENT

A. Waste Generation and Management Activities

1. Is any hazardous industrial solid waste (see Title 40, Code of Federal Regulations, Part 261) presently or proposed to be generated at your facility?

__X__ Yes ____ No

If you checked "no," go to Section III.B.2. below.
If you checked "yes," answer the following question.

1. Are you presently registered with TDWR as a solid waste generator?

__X__ Yes ____ No

If you checked "no," contact the Solid Waste Section of TDWR in Austin, Texas to obtain registration information. Also, continue with the application form (go to Number 2 below).

If you checked "yes," go to Section I of your Notice of Registration, determine which of your wastes are hazardous, and list these wastes (and mixtures) in Table III-1 (see Number 2 below).

2. Complete Table III-1 below, listing all hazardous wastes and all mixtures containing any hazardous waste which are presently or proposed to be generated at your facility. (see 40 CFR 261.31-33) (attach additional copies as necessary.)

In this table, "TDWR Sequence Number" refers to the number in the left-hand column in Section I of your Notice of Registration (Note: If you are not registered with TDWR, enter "NA" for TDWR Sequence Number and TDWR Waste Code Number.)

For the EPA Hazard Code and EPA Hazardous Waste Numbers, see 40 CFR 261.30-33. For annual quantity, provide the amount in units of pounds (as generated) for each waste and/or waste mixture.

Please group listings of wastes by SIC code (insofar as your processes are designated by SIC codings) and, within the general SIC code groups, give a brief description of the specific process or operation from which the waste has been generated.

B. Waste Management Facilities Summary

1. For each waste and waste mixture listed in Table III-1 that is presently or proposed to be managed on-site, provide the summary sheet shown in Table III-2 (Note: you must make copies of Table III-2 and submit the completed set of tables as "Attachment D").

Table III-1 Generated Hazardous Wastes and Management Activities

Verbal Description of Waste	TDWR Sequence Number	TDWR Waste Code Number	EPA Hazard Code	EPA Hazardous Waste No. F006, F009	Waste Management Activities (Check applicable items) Off-Site Disposal	On-Site Storage[1]	On-Site Processing[2]	On-Site Disposal	Annual Quantity Generated (lbs)	SIC Code and Process
PAINT SLUDGE	11	150110	R,T	F017, F018	X	X			T,308,060	SPRAY PAINTING
WASTE OILS AND GREASES	8	210450	I		X	X			84,000gal	OVERFILL SPILLAGE
SALT BATH SLUDGE	12	170320	R,T	F011 U239	X	X			26,400gal	CLEAN STRIP TANK
WASTE THINNER	7	104000	I	U002, U220	X	X			30,000gal	CLEAN PAINT LINES

[1] "Storage" means the interim containment or control of waste after generation and prior to ultimate disposal.

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a carrier in conveying or transporting solid waste by truck, ship, pipeline, or other means.

Table III-2 Hazardous Waste Management Facility Component Summary Sheet

Verbal Description of Waste: PAINT SLUDGE

Process (see last column on Table III-1): SPRAY PAINTING

RCRA Sequence Number of Waste (if assigned): II

Indicate the facility components used for storage/processing/disposal of the above-specified waste by entering the number of such facility components by which this waste is managed.

___ Lagoon/Pond (unlined)
___ Lagoon/Pond (lined)
___ Basin (earthen, above-grade lined)
___ Basin (earthen, above-grade unlined)
___ Basin (earthen, below-grade lined)
___ Basin (earthen, below-grade unlined)
___ Basin (concrete, above-grade lined)
___ Basin (concrete, above-grade unlined)
___ Basin (concrete, below-grade lined)
___ Basin (concrete, below-grade unlined)
___ Basin (other)
___ Pit (lined)
___ Pit (unlined)
___ Incinerator
___ Open Controlled Incineration Area
___ Boiler (energy-producing)
___ Landfill (sanitary)
___ Landfill (surface, open)
___ Landfill (other)
___ Landfarm
___ Landspreading Area
___ Spray Irrigation Area
___ Flood Irrigation Area
___ Septic Tank/Drain Field
___ Injection Well
___ Tank (surface storage)
___ Tank (sub-surface storage)
___ Tank (surface processing)
___ Tank (sub-surface processing)
___ Tank (other)
___ Drum Storage Area (open)
___ Drum Storage Area (enclosed)
___ Drum Storage Area (other)
___ Bulk Storage Area (open)
___ Bulk Storage Area (enclosed)
___ Bulk Storage Area (other)
2 Other (specify): DUPLEX GRIT SEPARATORS

2. Has the applicant at any time conducted the on-site storage, processing, or disposal of industrial solid waste now identified or listed as hazardous waste?

__X__ Yes _____ No

If you checked "yes," complete Table III-3 indicating the hazardous industrial solid waste management facility components which were once utilized at your plant site but are no longer in service (inactive facility components).

If you checked "no" and if no hazardous industrial solid waste is presently or proposed to be generated or managed at your facility, then you need not file this permit application. Otherwise, proceed with application form.

For each facility component indicated in Table III-2 (Attachment D) and Table III-3, complete the following Table III-4 attaching additional copies as necessary. Enter the name of each facility component as specified in the earlier tables.

Give the design capacity of each facility component in any of the units shown. In the case of inactive facilities for which design details are unavailable, an estimate of the design capacity is sufficient.

Please note that each facility component should be described in your own words on the line provided for "verbal description."

4. Provide an estimate of the total weight (lbs) of hazardous industrial solid waste material that has been disposed of and/or stored within your site boundaries and not removed to another site.

1,033,000

C. Location of Waste Management Facilities and Components

Submit as "Attachment E" a drawn-to-scale topographic map (or other map if topographic map is unavailable) extending one mile (and only one mile) beyond the property boundaries of the overall plant site depicting the following:

1. The approximate boundaries of the site described in Section B, and within these boundaries the location and boundaries of the areas occupied by each active, inactive, and proposed facility component listed in Tables III-2 and III-3 for facility components. Each depicted area should be labeled to identify the facility component(s), component status (i.e., active, inactive, or proposed), and area size in acres.

Table 1 (pt. 2 of 2). Hazardous Industrial Solid Waste Management Facility Components

Indicate the inactive facility components which were used for storage/processing/disposal of hazardous wastes or mixtures containing any hazardous waste by entering the number of such facility components in the space provided.

___ Lagoon/Pond (lined)

___ Basin (earthen, above-grade, lined)

___ Basin (earthen, above-grade, unlined)

___ Basin (earthen, below-grade, lined)

___ Basin (earthen, below-grade, unlined)

___ Basin (concrete, above-grade, lined)

___ Basin (concrete, above-grade, unlined)

___ Basin (concrete, below-grade, lined)

___ Basin (concrete, below-grade, unlined)

___ Basin (other)

___ Pit (lined)

___ Pit (unlined)

___ Incinerator

___ Open burning/open detonation area

___ Boiler (energy-producing)

___ Land treatment

___ Landfill

___ Landspreading Area

___ Spray Irrigation Area

___ Flood Irrigation Area

___ Septic Tank/Drain Field

___ Injection Well

___ Tank (surface storage)

___ Tank (sub-surface storage)

___ Tank (surface processing)

___ Tank (sub-surface processing)

___ Tank (other)

___ Drum Storage Area (open)

___ Drum Storage Area (enclosed)

___ Drum Storage Area (other)

___ Bulk Storage Area (open)

___ Bulk Storage Area (enclosed)

___ Storage Area (other)

___ Other (specify) _____

_____

Table III-4 Hazardous Waste Facility Components List

Facility Component	DWG. No.	Status			Design Capacity			Number of Years Utilized	Date Initial Service
Name		Inactive	Active	Proposed	(cu yds)	(gal)	(lbs)		
(5) BASIN (CONCRETE BELOW-GRADE UNLINED)	11		X			583,000		26	1954
Verbal Description: OPEN TOP, TWO COMPARTMENT CONCRETE BASIN USED TO INCREASE RETENTION TIME TO SETTLE SOLIDS. FLOW INTO BASIN IS BY PUMP FROM GRIT SEPARATOR SUMP. FLOW OUT OF BASIN TO SANITARY SEWER IS BY GRAVITY									
(7) DUPLEX GRIT SEPARATOR	11		X			12,260 (EACH)		7	4-9 1
Verbal Description: TWO STEEL OPEN TOP TANKS WITH DRAG BARS AND SKIMMERS WHICH REMOVE FLOATING AND SETTLED SOLIDS									
(1) DRUM STORAGE AREA (OPEN)	8 of 12		X			92,400		26	1954
Verbal Description: CURBED, CONCRETE SLAB, UNCOVERED, APPROXIMATELY 7000 SQ. FEET IN AREA									
Verbal Description:									
Verbal Description:									
Verbal Description:									

b. The overall facility and all surface intake and discharge structures;

c. All injection wells where liquids are injected underground;

d. All known monitor wells and boreholes within the property boundaries of the overall plant site; and

e. All wells, springs, other surface water bodies, and drinking water wells within the map area and the purpose for which each water well is used (e.g., domestic, livestock, agricultural, industrial, etc.).

2. Submit as "Attachment F" photographs which clearly delineate all hazardous waste facility structures and storage, processing, and disposal areas, as well as sites of future storage, processing, and disposal areas.

D. Flow Diagram/Description

Show as "Attachment G" process flow diagrams or step-by-step word descriptions of the process flow, depicting the handling, collection, storage, processing, and/or disposal of each of the hazardous wastes previously listed in this application.

The flow diagrams or descriptions should include the following information:

1. Originating point of each waste and waste classification code;

2. Means of conveyance utilized in every step of the process flow;

3. Name and function of each facility component through which the waste passes;

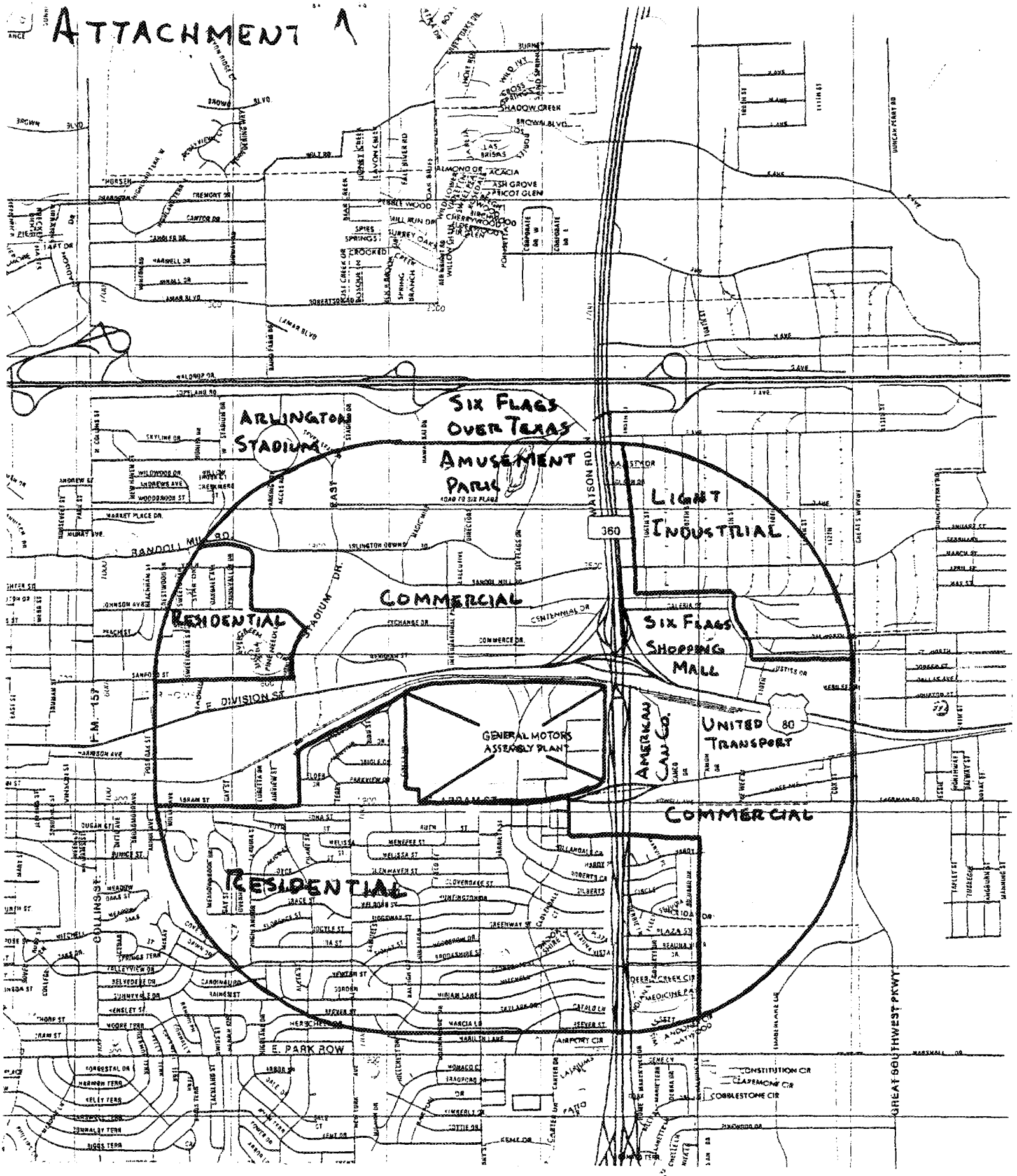
4. The ultimate disposition of all wastes (i.e., off-site, specify "off-site") and waste residues.

IV. INDEX OF ATTACHMENTS

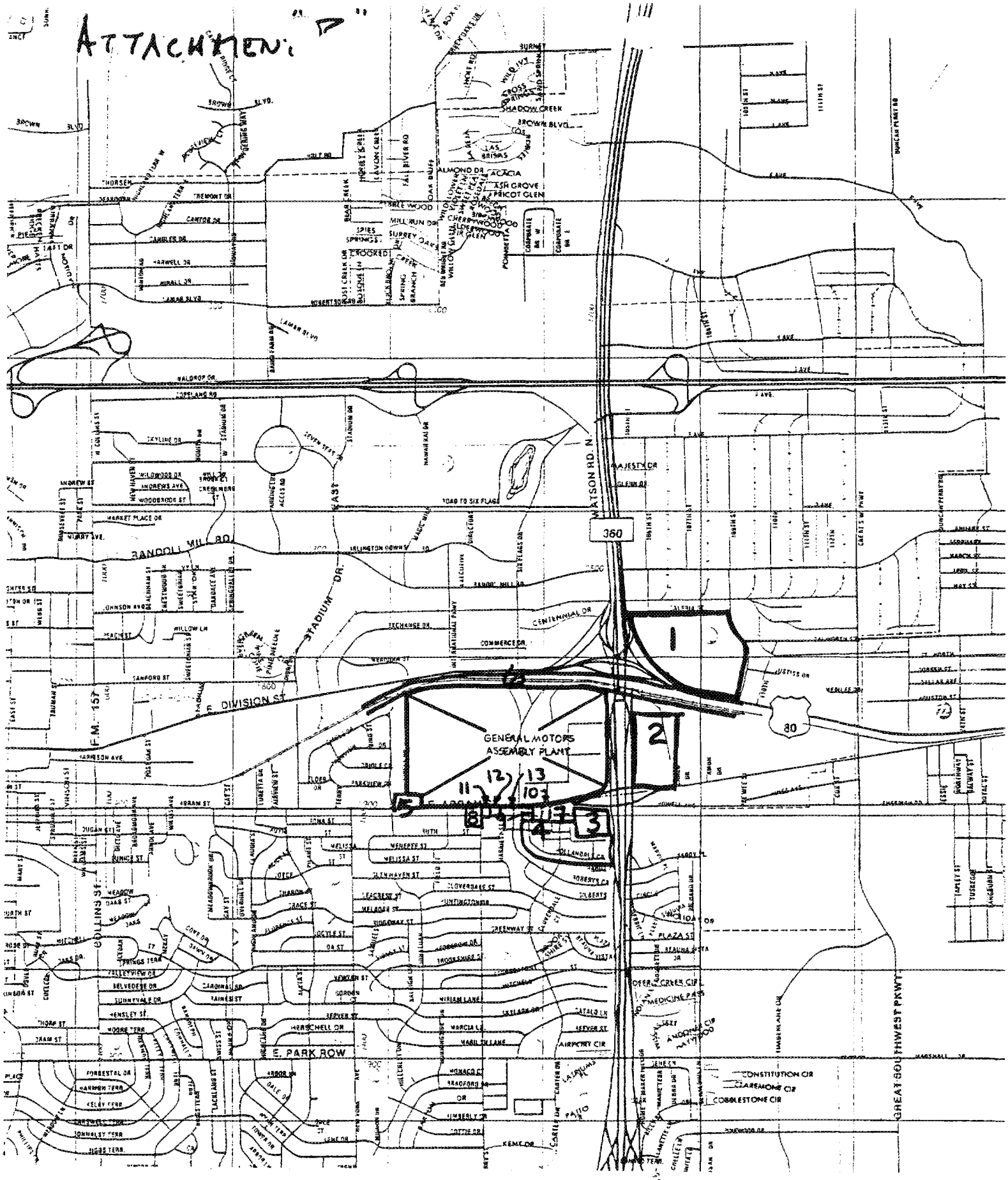
List and index below all attachments to this application and indicate if included or not included:

Item	Mandatory Attachments	Attachment	Included	Not Included
II.A.5.	USGS map	A	X	
II.A.6.a	Affected landowners	B	X	
II.B.	Site legal description	C	X	
III.B.1.	Hazardous waste facility component summary sheets	D	X	
III.C.1.	Facility boundaries and adjacent waters map	E	X	
III.C.2.	Photographs	F	X	
III.D.	Process flow diagram/description	G	X	
	Other Attachments as Required			
II.D.2.a	Lease			X
III.A.2.	Additional generated waste list (Table III-1)		X	
III.B.3.	Additional hazardous waste facility component list (Table III-2)		X	

ATTACHMENT A



ATTACHMENT D



ATTACHMENT "B"

1. Six Flags Mall Shopping Center
   411 Six Flags Mall
   Arlington, Texas 76010
   817/640-1641

2. American Can Co.
   2801 East Abram
   Arlington, Texas 76010
   817/649-3381

3. K-Mart Discount Store #4132
   2540 East Abram
   Arlington, Texas 76010
   817/277-1376

4. Hollandale House Apartments
   221 Hollandale Circle
   Arlington, Texas 76010
   817/265-7111

5. Tanglewood Apartments
   2015 East Abram
   Arlington, Texas 76010
   817/274-2011

6. Texas & Pacific Railroad
   T & P Building
   Fort Worth, Texas 76101
   817/332-3201

7. Fas Gas #2
   2530 East Abram
   Arlington, Texas 76010
   817/275-9280

8. Seven Eleven #94
   2120 East Abram
   Arlington, Texas 76010
   817/274-2381

9. Comet One Hour Dry Cleaning & Laundry
   2500-C East ABram
   Arlington, Texas 76010
   817/277-2491

10. Intercity Draperies
    2504 East Abram
    Arlington, Texas 76010
    817/265-1011

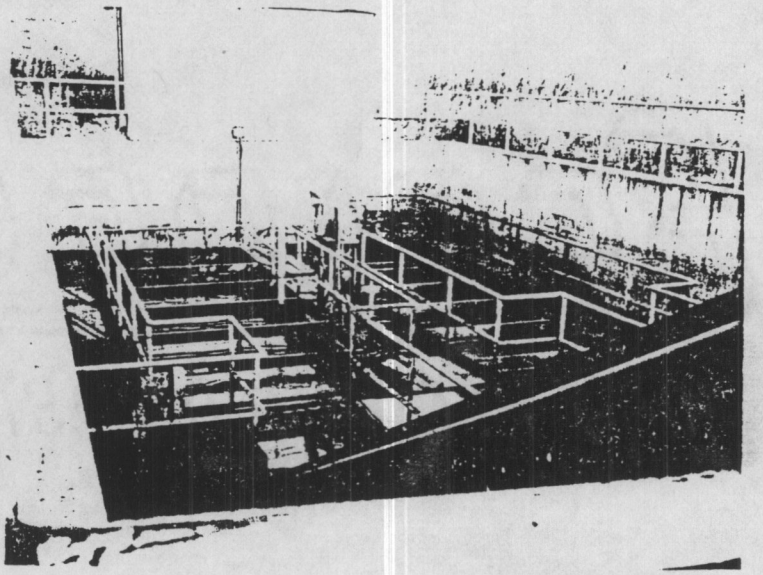
ATTACHMENT "B" (cont'd)

11. Kountry Pit Bar - B - Que
    2200 East Abram
    817/274-3211
    Arlington, Texas 76010

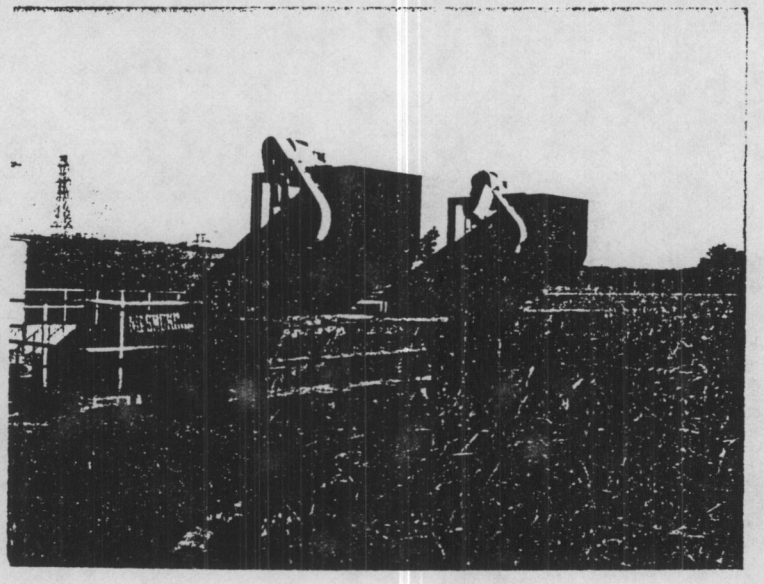
12. Ace of Clubs
    2204 East Abram
    Arlington, Texas 76010

13. Myers & Associates
    Republic National Bank Building
    Dallas, Texas 75201
    214/744-4731

ATTACHMENT F

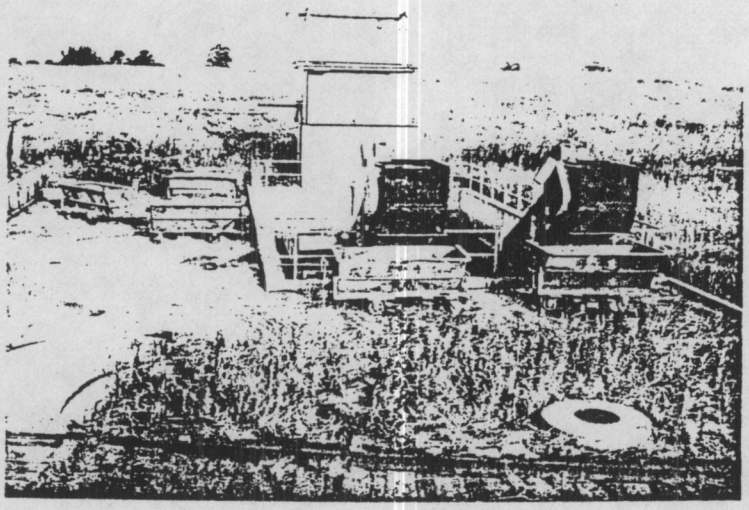


DUPLEX GRIT SEPARATORS

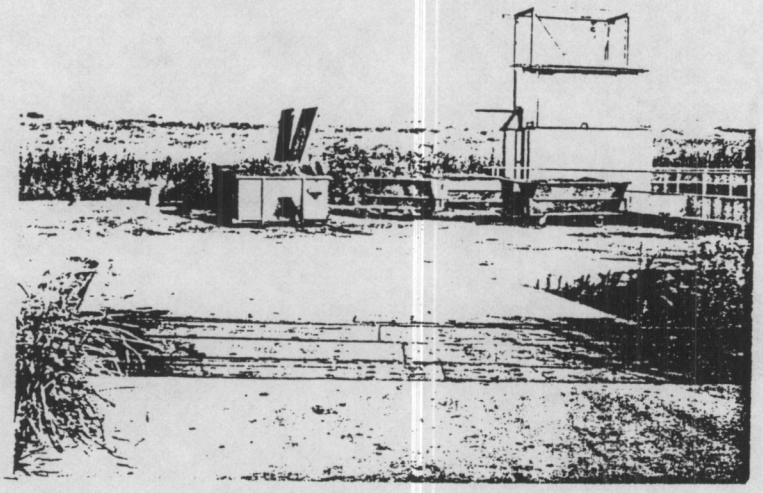


GRIT SEPARATOR CONVEYOR DUMP INTO GONDOLAS

ATTACHMENT F



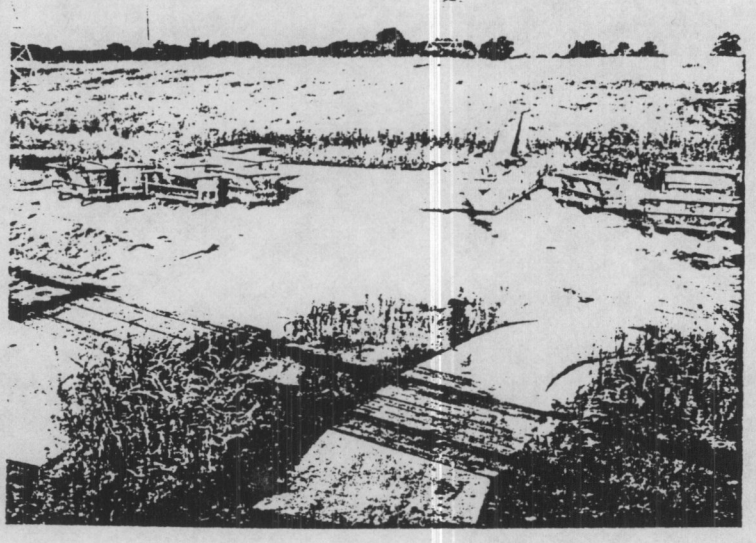
OVERALL VIEW OF DUPLEX GRIT SEPARATORS



GONDOLAS AND LARGE SLUDGE CONTAINER

ATTACHMENT F"

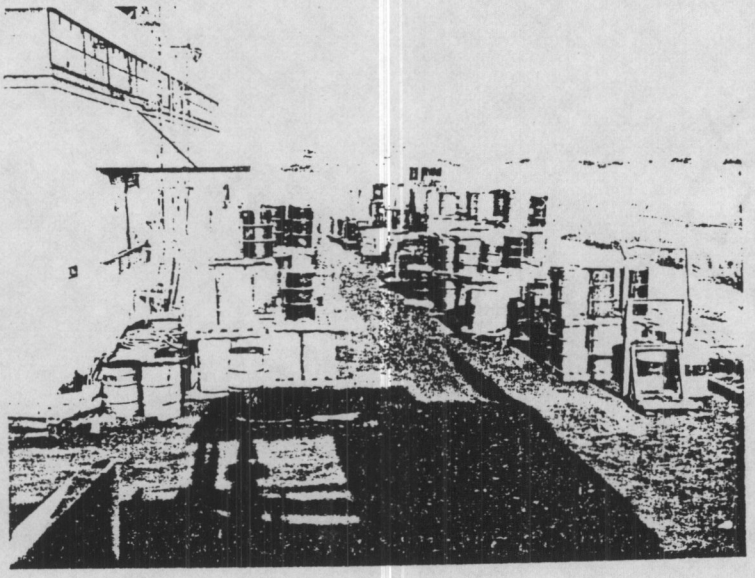
SLUDGE GONDOLAS



OVERALL VIEW OF SLUDGE GONDOLAS AND HANDLING AREA

ATTACHMENT F"

BELOW GRADE CONCRETE BASIN (UNLINED)



DRUM STORAGE AREA

ATTACHMENT "G"

PAINT SLUDGE 150110

Originates in spray booth as overspray which is removed from the air stream by water scrubbers and flows through the trade waste sewer system to grit separators. The grit separator removes the paint sludge by means of drag conveyors and skimmers and deposits it into portable sludge gondolas which, when full, are emptied into larger containers. When large container is full it is transported by truck to an off-site disposal area. The large container is emptied and then returned to our facility.

WASTE OILS AND GREASES 210450

Originates in numerous pits and trenches throughout our facility as spillages and overflow from automotive fluid filling operations. Waste fluids are pumped into a large portable tank and then transferred to drums which are accumulated in a drum storage area until there is sufficient quantity to fill a tank truck. The wastes are pumped out of the drums into a tank truck which transports them to an off-site disposal area.

SALT BATH SLUDGE 170320

Originates when a molten salt bath paint stripping tank is periodically cleaned. The sludge is emptied into barrels which are accumulated in the drum storage area and then hauled off by truck to an off-site disposal area.

WASTE THINNER 104000

Originates when paint lines are periodically flushed out with paint thinner and is emptied into drums which are accumulated in the drum storage area. Drums are pumped into a tank truck and then hauled to an off-site disposal area.

NOTE:

The off-site disposal area referred to above is a licensed and approved disposal site.

Table III-2 Hazardous Waste Management Facility Component Summary Sheet

Verbal Description of Waste WASTE OILS AND GREASES

Process (see last column in Table III-1) OVERFILL SPILLAGE

TDWR Sequence Number of Waste (if assigned) 8

Indicate the facility components used for storage/processing/disposal of the above-specified waste by entering the number of such facility components by which this waste is managed.

___ Lagoon/Pond (unlined)

___ Lagoon/Pond (lined)

___ Basin (earthen, above-grade lined)

___ Basin (earthen, above-grade unlined)

___ Basin (earthen, below-grade lined)

___ Basin (earthen, below-grade unlined)

___ Basin (concrete, above-grade lined)

___ Basin (concrete, above-grade unlined)

___ Basin (concrete, below-grade lined)

___ Basin (concrete, below-grade unlined)

___ Basin (other)

___ Pit (lined)

___ Pit (unlined)

___ Incinerator

___ Open Controlled Incineration Area

___ Boiler (energy-producing)

___ Landfill (sanitary)

___ Landfill (surface, open)

___ Landfill (other)

___ Landfarm

___ Landspreading Area

___ Spray Irrigation Area

___ Flood Irrigation Area

___ Septic Tank/Drain Field

___ Injection Well

___ Tank (surface storage)

___ Tank (sub-surface storage)

___ Tank (surface processing)

___ Tank (sub-surface processing)

___ Tank (other)

1 Drum Storage Area (open)

___ Drum Storage Area (enclosed)

___ Drum Storage Area (other)

___ Bulk Storage Area (open)

___ Bulk Storage Area (enclosed)

___ Bulk Storage Area (other)

___ Other (specify _____

_____)

Table III-2 Hazardous Waste Management Facility Component Summary Sheet

Verbal Description of Waste: SALT BATH SLUDGE

Process (see last column in Table III-1): CLEAN STRIP TANK

TDWR Sequence Number of Waste (if assigned): 12

Indicate the facility components used for storage/processing/disposal of the above-specified waste by entering the number of such facility components by which this waste is managed.

___ Lagoon/Pond (unlined)
___ Lagoon/Pond (lined)
___ Basin (earthen, above-grade lined)
___ Basin (earthen, above-grade unlined)
___ Basin (earthen, below-grade lined)
___ Basin (earthen, below-grade unlined)
___ Basin (concrete, above-grade lined)
___ Basin (concrete, above-grade unlined)
___ Basin (concrete, below-grade lined)
___ Basin (concrete, below-grade unlined)
___ Basin (other)
___ Pit (lined)
___ Pit (unlined)
___ Incinerator
___ Open Controlled Incineration Area
___ Boiler (energy-producing)
___ Landfill (sanitary)
___ Landfill (surface, open)
___ Landfill (other)

___ Landfarm
___ Landspreading Area
___ Spray Irrigation Area
___ Flood Irrigation Area
___ Septic Tank/Drain Field
___ Injection Well
___ Tank (surface storage)
___ Tank (sub-surface storage)
___ Tank (surface processing)
___ Tank (sub-surface processing)
___ Tank (other)
1 Drum Storage Area (open)
___ Drum Storage Area (enclosed)
___ Drum Storage Area (other)
___ Bulk Storage Area (open)
___ Bulk Storage Area (enclosed)
___ Bulk Storage Area (other)
___ Other (specify _____)

Table III-2 Hazardous Waste Management Facility Component Summary Sheet

Verbal Description of Waste: WASTE THINNER

Process (see last column in Table III-1): CLEAN PAINT LINES

TDWR Sequence Number of Waste (if assigned): NONE

Indicate the facility components used for storage/processing/disposal of the above-specified waste by entering the number of such facility components by which this waste is managed.

___ Lagoon/Pond (unlined)
___ Lagoon/Pond (lined)
___ Basin (earthen, above-grade lined)
___ Basin (earthen, above-grade unlined)
___ Basin (earthen, below-grade lined)
___ Basin (earthen, below-grade unlined)
___ Basin (concrete, above-grade lined)
___ Basin (concrete, above-grade unlined)
___ Basin (concrete, below-grade lined)
___ Basin (concrete, below-grade unlined)
___ Basin (other)
___ Pit (lined)
___ Pit (unlined)
___ Incinerator
___ Open Controlled Incineration Area
___ Boiler (energy-producing)
___ Landfill (sanitary)
___ Landfill (surface, open)
___ Landfill (other)

___ Landfarm
___ Landspreading Area
___ Spray Irrigation Area
___ Flood Irrigation Area
___ Septic Tank/Drain Field
___ Injection Well
___ Tank (surface storage)
___ Tank (sub-surface storage)
___ Tank (surface processing)
___ Tank (sub-surface processing)
___ Tank (other)
1 Drum Storage Area (open)
___ Drum Storage Area (enclosed)
___ Drum Storage Area (other)
___ Bulk Storage Area (open)
___ Bulk Storage Area (enclosed)
___ Bulk Storage Area (other)
___ Other (specify _____)

THE VALUE LINE Investment Survey

Part 3 Ratings & Reports

EDITION 1
Pages 100–242

File in the binder in order of edition number, removing previous edition dated the same number.

March 24, 1989

★★ Rank highest for Timeliness.
★ Rank above average.

ESPECIALLY NOTEWORTHY: *Edition 1 welcomes* ***Bolar Pharmaceutical*** *(page 213), formerly an unassigned stock in Edition 3, to the Medical Supplies Industry.*

There may be light at the end of the tunnel for ***LILCO****. Learn why prospects are brightening (page 185).*

Kodak *is shooting for another good year in 1989. We've brought this developing story into focus on page 142.*

Thermo Instruments' *markets continue to heat up, warming the hearts of shareholders. The hot story is on page 161.*

Although ***Volvo's*** *auto sales are just idling, trucks and buses are racing ahead. Food operations, meanwhile, are from hunger. We've set the table on page 112.*

Nicolet *is no longer shouting about its revolutionary new hearing aid. Our views however, can be heard on page 152.*

New car sales are likely to stall in '89, and that's good news for the Auto Parts (Replacement) Industry. Speculative investors may wish to kick the tires of ***Federal Mogul*** *(page 117),* ***Sun Electric*** *(page 123), and* ***Wynn's Int'l*** *(page 124).*

Kollmorgen's *share price may tumble if the company continues to frustrate an unfriendly acquisition attempt. See page 148 for details.*

Even at $60,000 a copy, heavy-duty truck sales are in high gear. Profits are on a steep upgrade at ***Mack*** *(page 108),* ***Navistar*** *(page 109), and* ***PACCAR*** *(page 110).*

Is the fight for ***Polaroid*** *moving into its final round? Take a ringside seat on page 155.*

Recognition Equipment *is still being stalked. We've drawn a bead on the prospects on page 156.*

In three parts: Part I is the Summary & Index. Part II is Selection & Opinion. This is Part III, Ratings & Reports. Volume XLIV, No. 27.

Published weekly by VALUE LINE, INC. 711 Third Avenue, New York, N.Y. 10017

GENERAL MOTORS ...GE-GM

RECENT PRICE 42 | P/E RATIO 6.3 (Trailing: 6.2 Median: 10) | RELATIVE P/E RATIO 0.52 | DIV'D YLD 8.9% | VALUE LINE 105

TIMELINESS 2 (Relative Price Performance Next 12 Mos.) — 1 Highest, 2 Above Average
SAFETY 1 (Scale: 1 Highest to 5 Lowest)
BETA .95 (1.00 = Market)

1991-93 PROJECTIONS

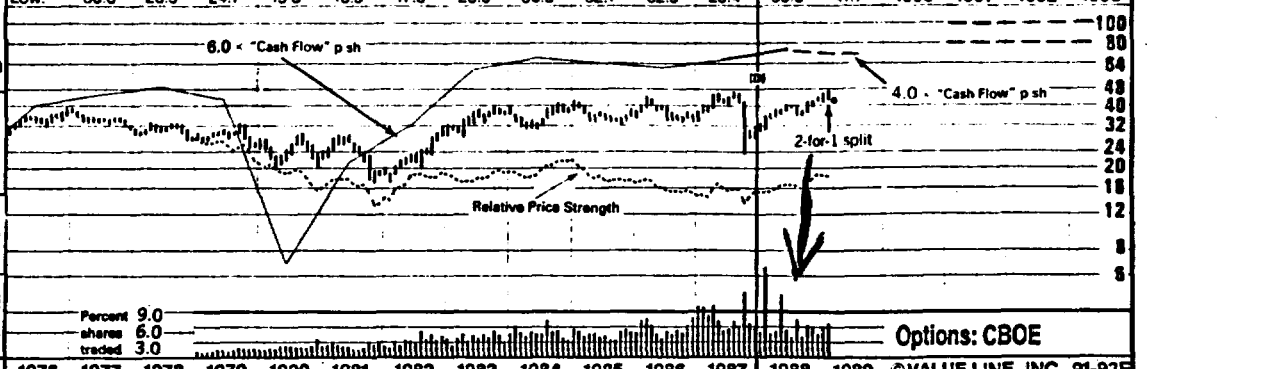
	Price	Gain	Ann'l Total Return
High	100	(+140%)	29%
Low	80	(+ 90%)	23%

Insider Decisions

	M	J	J	A	S	O	N	D	J
to Buy	0	0	1	0	0	0	0	0	0
Options	0	1	0	0	0	1	0	3	2
to Sell	2	7	5	7	4	0	1	1	1

Institutional Decisions

	2Q'88	3Q'88	4Q'88
to Buy	137	131	141
to Sell	177	165	148
Hld's (000)	242660	241430	254810



1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	©VALUE LINE, INC.	91-93E
53.22	62.64	55.08	62.31	82.42	96.23	110.80	114.58	97.51	103.25	96.27	118.43	132.97	152.40	162.43	162.77	196.42	208.35	Revenues per sh	259.60
5.36	5.75	3.11	3.74	6.69	7.53	8.19	7.11	1.15	3.55	5.38	9.98	11.36	10.70	10.16	11.13	19.07	18.45	"Cash Flow" per sh	24.85
3.76	4.17	1.64	2.16	5.04	5.81	6.12	5.02	d1.33	.54	1.55	5.92	7.11	6.14	4.11	5.03	6.82	6.00	Earnings per sh (A)	9.00
2.23	2.63	1.70	1.20	2.78	3.40	3.00	2.65	1.48	1.20	1.20	1.40	2.38	2.50	2.50	2.50	2.50	3.00	Div'ds Decl'd per sh (B)	4.00
1.64	2.04	2.55	2.09	1.75	3.28	4.80	5.83	8.72	10.81	5.79	3.05	5.70	9.65	12.78	7.53	9.18	9.65	Cap'l Spending per sh	12.50
19.71	21.25	21.23	22.21	24.46	26.85	29.98	32.32	29.40	28.60	28.82	32.44	37.75	45.99	47.80	52.76	57.81	62.70	Book Value per sh	89.40
571.85	571.46	572.79	573.35	572.43	571.14	570.56	578.73	592.03	607.25	623.54	629.77	630.90	632.37	632.97	625.31	612.91	600.00	Common Shs Outst'g (C)	520.00
10.5	7.9	13.2	10.9	6.9	5.9	4.9	5.7	--	44.3	14.9	5.8	5.0	5.9	9.1	7.7	5.5		Avg Ann'l P/E Ratio	10.0
.72	.78	1.85	1.45	.88	.77	.67	.82	--	5.38	1.64	.49	.47	.48	.62	.51	.45		Relative P/E Ratio	.85
5.7%	7.9%	7.9%	5.1%	8.0%	9.9%	9.9%	9.3%	6.0%	5.1%	5.2%	4.1%	6.7%	6.9%	6.7%	6.5%	6.6%		Avg Ann'l Div'd Yield	4.4%
63221	66311	57729	62699	60026	74582	83890	96372	102814	101782	120388	125000							Revenues ($mill) (D)	135000
57.6%	60.5%	63.8%	62.5%	62.7%	58.7%	55.9%	59.7%	55.1%	50.8%	48.2%	50.0%							Market Share	52.0%
12.1%	8.9%	5%	3.6%	5.6%	10.8%	8.8%	7.3%	4.8%	5.9%	9.2%	7.0%							Operating Margin	7.0%
3508.0	2892.7	d762.5	333.4	962.7	3730.2	4516.5	3999.0	2944.7	3550.9	4632.1	3995							Net Profit ($mill)	5440
48.7%	45.0%	--	--	--	44.7%	32.8%	35.3%	--	--	31.2%	34.0%							Income Tax Rate	34.0%
5.6%	4.4%	NMF	.5%	1.6%	5.0%	5.4%	4.2%	2.9%	3.5%	3.8%	3.2%							Net Profit Margin	4.0%
7948.9	6688.2	3148.3	1161.0	1658.1	5890.8	6276.7	1957.5	3920.3	14243	42581	46650							Working Cap'l ($mill) (D)	58790
978.9	880.0	2058.3	4043.9	4745.1	3521.8	2772.9	2867.2	9825.3	18294	31614	32215							Long-Term Debt ($mill) (D)	32265
17389	18986	17689	17650	18252	20710	24070	29335	30488	33225	35672	37840							Net Worth ($mill)	46730
19.3%	14.8%	NMF	2.4%	5.4%	16.3%	17.5%	13.0%	8.3%	4.1%	9.8%	8.5%							% Earned Total Cap'l	9.5%
20.2%	15.2%	NMF	1.9%	5.3%	18.0%	18.8%	13.6%	9.7%	10.7%	13.0%	10.5%							% Earned Net Worth	11.5%
10.4%	7.3%	NMF	NMF	1.2%	13.9%	12.6%	8.2%	4.2%	5.7%	8.4%	6.0%							% Retained to Comm Eq	7.0%
49%	53%	NMF	NMF	78%	24%	34%	40%	56%	47%	36%	46%							% All Div'ds to Net Prof	39%

CAPITAL STRUCTURE as of 12/31/88 (D)
Total Debt $88130 mill. Due in 5 Yrs $19169 mill.
LT Debt $31614 mill. LT Interest $3905 mill.
Incl. $294.8 mill. capitalized leases.
(LT interest earned: 2.7x; total interest coverage: 1.9x) (47% of Cap'l)
Pension Liability None in '88 vs. None in '87
Pfd Stock $236.4 mill. Pfd Div'd $26.0 mill.
1,530,194 shs. $5.00 cum. ($100 par); 814,100 shs. $3.75 cum. ($100 par)
(Less than 1% of Cap'l)
Common Stock 612,913,342 shs. (53% of Cap'l)
50,646,603 Class E shs.; 128,388,969 Class H shs. (Adj. for 2-for-1 split payable 3/31/89)

CURRENT POSITION ($MILL.) (D)	1988	1987	12/31/88
Cash Assets	4018.8	4706.4	10181.4
Receivables	11304.3	22194.1	92017.5
Inventory(LIFO)	7235.1	7939.7	7984.3
Other	4210.2	4931.3	2035.4
Current Assets	26768.4	39771.5	112218.6
Accts Payable	6368.0	7087.8	7896.9
Debt Due	2730.1	2878.7	56516.1
Other	13750.0	15561.7	5225.1
Current Liab.	22848.1	25528.2	69638.1

ANNUAL RATES of change (per sh)	Past 10 Yrs	Past 5 Yrs	Est'd '85-'87 to '91-'93
Sales	7.0%	10.0%	NMF
"Cash Flow"	6.0%	26.0%	NMF
Earnings	1.5%	NMF	11.0%
Dividends	--	14.0%	8.5%
Book Value	7.0%	11.0%	11.0%

Calendar	QUARTERLY SALES ($ mill.) Mar. 31	June 30	Sept. 30	Dec. 31	(D) Full Year
1985	24183	25057	22491	24641	96372
1986	26820	27625	22841	25528	102814
1987	26096	26699	22606	26381	101782
1988	26443	29895	25041	28850	110229
1989	*30000*	*31000*	*25000*	*29000*	*115000*

Calendar	EARNINGS PER SHARE (A) Mar. 31	June 30	Sept. 30	Dec. 31	Full Year
1985	1.66	1.79	.77	1.92	6.14
1986	1.76	1.46	.40	.49	4.11
1987	1.31	1.40	1.14	1.18	5.03
1988	1.21	2.26	1.23	2.12	6.82
1989	*2.00*	*1.75*	*.75*	*1.50*	*6.00*

Calendar	QUARTERLY DIVIDENDS PAID (B) Mar. 31	June 30	Sept. 30	Dec. 31	Full Year
1985	.625	.625	.625	.625	2.50
1986	.625	.625	.625	.625	2.50
1987	.625	.625	.625	.625	2.50
1988	.625	.625	.625	.625	2.50
1989	.75				

BUSINESS: General Motors is the world's largest auto manufacturer. 1988 output was 48% of U.S. total. Automotive products account for 87% of sales. Makes Chevrolet and GMC trucks. GM diesel locomotives, and engines. Operates plants in 17 foreign countries, principally in Western Europe, which make Vauxhall cars and Opel and Holden cars and trucks. Acquired EDS in '84, Hughes Aircraft in '85. Foreign business accounts for 16%, labor costs, 22% of sales. '88 depreciation rate: 10.9%. Estimated plant age: 10 years. Has 766,000 employees, 2 mill. stockholders. Insiders own 1% of stock. Chmn.: R. B. Smith. Pres.: R.C. Stempel. Inc.: DE. Address: 3044 West Grand Boulevard, Detroit, MI 48202. Telephone: 313-556-5000

GM stock has split 2-for-1. The new shares will be distributed on March 31st to holders of record on February 17th. GM's directors also authorized a 20% (50¢-a-share) hike in the annual dividend on a post-split basis, beginning with the March payment. *All per-share figures on this page have been adjusted for the split.*

GM appears intent on buying more market share in 1989 ... Despite the consensus view that the U.S. auto market will shrink slightly this year, GM boosted March-quarter production by 15% above that of 1988. Retail sales, however, remain sluggish. Thus far in '89, GM is showing the largest sales decline of the Big Three: Through February, the company's sales were down over 16% year-to-year. Although some plants have been idled in order to trim output of slower-selling models, dealer inventories have risen to about an 85-day supply (60–65 days is normal). Since GM still seems destined to increase production by 5% in the first half of this year, we have concluded that the company has elected to accept narrower margins—at least temporarily—in order to increase its dominance in the North American market.

... and reduced earnings are the most likely outcome. In 1988, GM propped up sales by giving back about $4.2 billion to customers through various forms of buyer incentives (roughly $710 per vehicle sold). At least that much will be required this year, given GM's aggressive production schedules and Value Line's forecast of a gradual slowing of economic growth in the second half. In fact, an expanded program of low-cost financing and cash rebates was announced in early March. We therefore expect GM's North American auto operations to be only marginally profitable this year. Earnings at GMAC, the company's captive finance unit, may be off again in '89, due to the volatile interest rate environment we expect in the remainder of the year. In all, a decline in share net of about 12% appears likely in '89. Still . . .

These top-quality shares are an attractive selection for the next six to twelve months, although earnings comparisons will probably turn negative later this year. For the pull to 1991-93, GM stock offers above-average total return (dividend plus capital gain) potential.

Mark Leach *March 24, 1989*

Company's Financial Strength	A+
Stock's Price Stability	90
Price Growth Persistence	25
Earnings Predictability	45

(A) Based on average shares outstanding. Next earnings report due late May. (B) Next dividend meeting about May 5. Goes ex about May 12. Approx. dividend payment dates: 10th of March, June, Sept. Dec. ■ Dividend reinvestment plan available. Plus stock: In '84, .05 Class "E" shs. (C) In millions, adjusted for stock splits & dividends. (D) Includes finance subsidiary from 1988. (E) Excludes GMAC.

Ref, 3

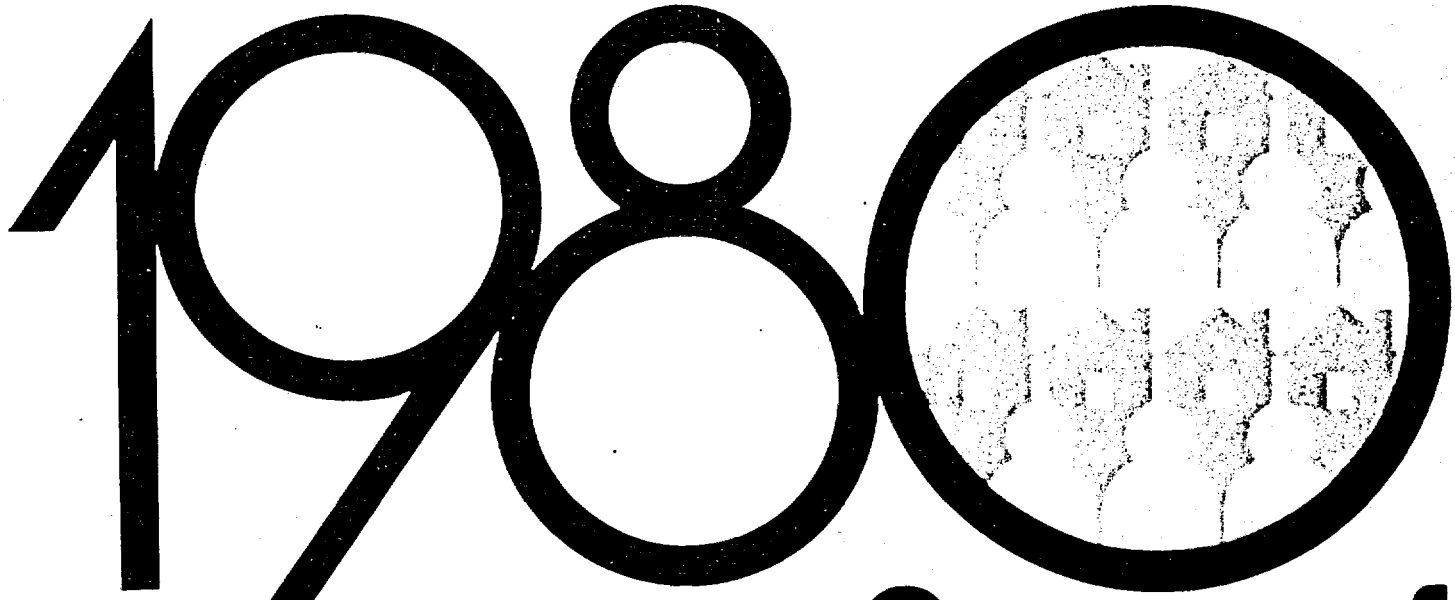
PHC80-2-131

Census Tracts

DALLAS-FORT WORTH, TEX.

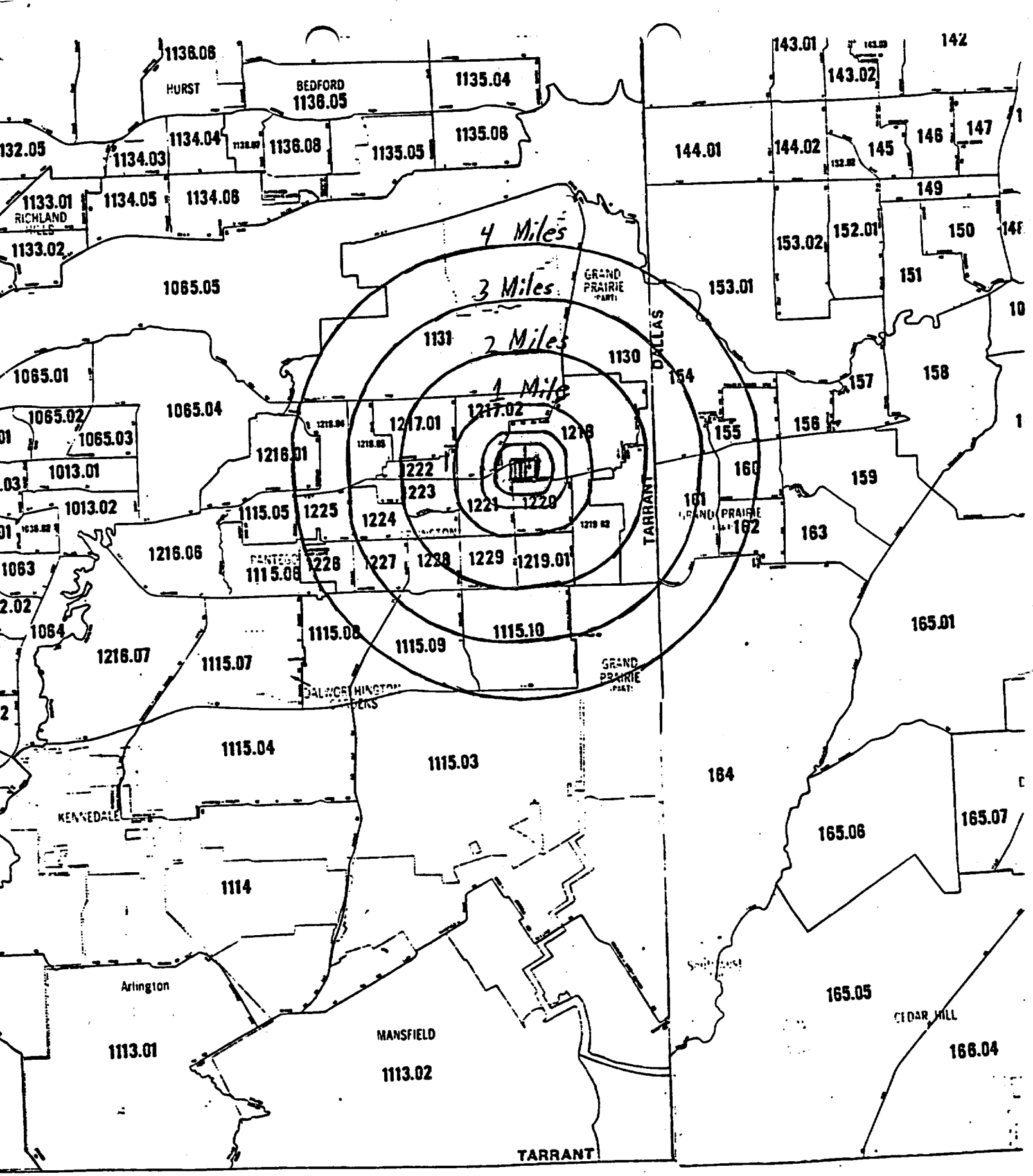
STANDARD METROPOLITAN STATISTICAL AREA

Section 1 of 2



Census of Population and Housing

U.S. Department of Commerce
BUREAU OF THE CENSUS



1980 CENSUS TRACTS

DALLAS-FORT WORTH, TEX.

STANDARD METROPOLITAN STATISTICAL AREA

N

FEET SCALE

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Garland city (pt.), Dallas County—Con.			Grand Prairie city (pt.), Dallas County									
	Tract 0190.13	Tract 0190.14	Tract 0190.15	Tract 0153.01*	Tract 0154	Tract 0155	Tract 0156	Tract 0157	Tract 0158*	Tract 0159*	Tract 0160	Tract 0161	Tract 0162
AGE													
Total persons	4 060	4 698	7 262	2 586	8 639	2 781	4 190	3 035	2 446	2 713	6 061	3 004	6 131
Under 5 years	466	408	568	189	608	259	455	324	213	301	569	224	424
5 to 9 years	385	501	669	189	597	209	365	306	211	268	527	302	532
10 to 14 years	285	491	711	146	662	187	339	311	193	195	457	319	616
15 to 19 years	414	480	807	160	819	255	325	307	214	217	481	335	617
20 to 24 years	650	322	743	277	736	374	479	309	254	296	636	257	483
25 to 34 years	844	924	1 309	462	1 359	514	733	504	460	446	1 024	416	945
35 to 44 years	399	740	1 194	268	1 203	226	377	313	328	223	598	345	946
45 to 54 years	239	466	722	335	1 071	221	362	240	268	183	532	344	789
55 to 64 years	150	256	321	317	979	216	409	233	188	282	587	243	541
65 to 74 years	105	68	164	176	377	188	260	134	101	207	405	153	165
75 years and over	123	42	54	67	219	132	86	54	36	95	245	66	73
3 and 4 years	174	169	229	70	244	106	173	120	85	107	221	97	183
16 years and over	2 874	3 193	5 170	2 021	6 606	2 080	2 966	2 034	1 803	1 915	4 414	2 084	4 446
18 years and over	2 729	2 993	4 828	1 964	6 288	1 988	2 837	1 915	1 718	1 839	4 219	1 952	4 167
21 years and over	2 381	2 762	4 351	1 851	5 794	1 798	2 640	1 729	1 595	1 681	3 923	1 768	3 842
60 years and over	304	197	357	381	1 010	438	535	291	219	442	932	313	447
62 years and over	270	163	297	322	825	397	453	243	180	393	813	271	339
Median	23.6	27.0	25.9	31.2	31.8	26.5	26.3	24.3	27.9	26.0	28.0	26.5	29.1
Female	2 174	2 419	3 593	1 336	4 419	1 431	2 141	1 500	1 153	1 451	3 161	1 597	3 096
Under 5 years	238	192	270	90	296	139	239	174	124	145	275	112	229
5 to 9 years	196	251	323	101	297	107	170	154	89	153	269	141	266
10 to 14 years	147	226	352	72	331	83	167	145	85	109	226	156	310
15 to 19 years	235	226	373	87	440	144	161	141	106	113	233	171	290
20 to 24 years	334	177	344	136	359	168	258	148	121	136	320	142	228
25 to 34 years	421	508	697	219	676	258	358	238	201	236	508	233	486
35 to 44 years	206	392	587	140	604	112	173	153	125	103	303	182	491
45 to 54 years	128	236	349	178	544	113	190	123	130	102	291	199	397
55 to 64 years	99	138	174	177	497	118	219	121	94	167	323	131	258
65 to 74 years	68	40	89	90	204	106	144	66	52	125	237	91	88
75 years and over	102	33	35	46	162	83	62	37	26	62	176	39	51
3 and 4 years	91	87	107	36	114	56	88	68	51	50	114	49	104
16 years and over	1 570	1 699	2 580	1 056	3 403	1 078	1 533	1 000	832	1 024	2 340	1 147	2 245
18 years and over	1 484	1 597	2 413	1 028	3 223	1 027	1 463	940	794	981	2 252	1 082	2 107
21 years and over	1 300	1 496	2 202	956	2 985	923	1 368	857	731	905	2 109	988	1 948
60 years and over	223	116	196	213	582	261	305	160	115	269	574	183	226
62 years and over	202	100	170	177	491	235	262	133	95	237	499	159	182
Median	23.9	28.3	26.8	31.9	32.2	27.1	26.5	24.5	26.7	26.9	29.5	28.0	29.7
HOUSEHOLD TYPE AND RELATIONSHIP													
Total persons	4 060	4 698	7 262	2 586	8 639	2 781	4 190	3 035	2 446	2 713	6 061	3 004	6 131
In households	3 948	4 698	7 262	2 586	8 489	2 712	4 162	3 035	2 241	2 713	5 941	3 000	6 131
Householder	1 621	1 475	2 367	1 095	3 040	1 068	1 413	919	732	1 010	2 133	1 021	1 954
Family householder	1 044	1 300	1 959	747	2 433	760	1 118	761	609	723	1 644	777	1 728
Nonfamily householder	577	175	408	348	607	308	295	158	123	287	489	244	226
Living alone	482	143	298	316	507	261	246	130	105	266	422	208	184
Spouse	668	1 034	1 655	623	2 151	610	945	615	528	561	1 339	510	1 559
Other relatives	1 452	2 105	2 991	814	3 087	952	1 679	1 409	921	1 046	2 314	1 397	2 531
Nonrelatives	207	84	249	54	211	82	125	92	60	96	155	72	87
Inmate of institution	112	–	–	–	122	–	–	–	215	–	120	4	–
Other, in group quarters	–	–	–	–	19	69	28	–	10	–	–	–	–
Persons per household	2.44	3.19	3.07	2.36	2.79	2.54	2.95	3.30	3.06	2.69	2.79	2.94	3.14
Persons per family	3.03	3.41	3.37	2.92	3.15	3.06	3.35	3.66	3.38	3.22	3.22	3.45	3.37
Persons 65 years and over	228	110	218	243	596	320	346	188	137	302	658	219	238
In households	123	110	218	243	481	278	342	188	137	302	545	219	238
Householder	96	56	121	168	316	192	225	122	85	217	382	144	139
Nonfamily householder	68	23	35	73	124	95	84	40	31	114	182	56	49
Living alone	66	22	34	72	121	91	83	38	31	114	177	53	48
Spouse	16	21	53	57	109	66	80	46	31	62	113	41	61
Other relatives	7	31	44	18	52	19	32	16	21	20	47	29	37
Nonrelatives	4	2	–	–	4	1	5	4	–	3	3	5	1
Inmate of institution	105	–	–	–	100	–	–	–	–	–	105	–	–
Other, in group quarters	–	–	–	–	15	42	4	–	–	–	–	–	–
FAMILY TYPE BY PRESENCE OF OWN CHILDREN													
Families	1 044	1 300	1 959	747	2 433	760	1 118	761	609	723	1 644	777	1 728
With own children under 18 years	695	888	1 225	320	1 201	413	625	450	330	385	881	441	986
Number of own children under 18 years	1 167	1 596	2 251	564	2 141	729	1 226	970	658	773	1 678	919	1 810
Married-couple families	668	1 034	1 655	623	2 151	610	945	615	528	561	1 339	510	1 559
With own children under 18 years	398	689	1 024	258	1 042	308	527	368	285	291	697	250	876
Number of own children under 18 years	675	1 266	1 921	463	1 904	552	1 046	819	575	592	1 346	521	1 631
Female householder, no husband present	319	224	242	92	213	126	125	106	58	126	246	242	134
With own children under 18 years	265	178	178	46	131	93	72	64	33	83	158	177	93
Number of own children under 18 years	441	298	289	76	203	157	132	120	59	164	285	368	156
MARITAL STATUS													
Male, 15 years and over	1 331	1 548	2 666	989	3 277	1 024	1 466	1 067	996	905	2 117	971	2 278
Single	353	397	727	205	753	253	312	277	198	194	479	300	531
Now married, except separated	708	1 063	1 697	633	2 223	629	987	679	684	611	1 393	534	1 590
Separated	54	14	34	19	51	21	25	20	24	14	41	37	20
Widowed	23	7	22	22	56	35	28	18	15	25	52	20	16
Divorced	193	67	186	110	194	86	114	73	73	61	152	80	113
Female, 15 years and over	1 593	1 750	2 648	1 073	3 486	1 102	1 565	1 027	853	1 044	2 391	1 188	2 289
Single	263	322	465	146	614	175	217	162	131	129	316	290	389
Now married, except separated	708	1 055	1 692	637	2 211	630	990	653	553	585	1 391	532	1 587
Separated	85	40	59	22	57	32	42	29	19	41	72	74	21
Widowed	197	93	119	127	340	148	168	96	64	155	365	114	126
Divorced	340	240	313	141	264	117	148	87	88	134	247	178	166

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Totals for split tracts in Dallas County—Con.											
	Tract 0159	Tract 0163	Tract 0164	Tract 0165.02	Tract 0165.05	Tract 0165.07	Tract 0166.01	Tract 0166.03	Tract 0167.01	Tract 0167.02	Tract 0168	Tract 0169.03	Tract 0169.04
AGE													
Total persons	3 656	3 892	20 241	4 753	3 486	9 556	3 471	6 648	7 084	8 485	7 165	3 178	383
Under 5 years	301	410	2 112	355	235	586	395	479	616	787	458	391	20
5 to 9 years	268	460	2 384	452	270	923	365	602	751	783	503	313	40
10 to 14 years	195	479	2 102	411	344	1 095	288	619	1 003	738	530	255	38
15 to 19 years	247	364	1 515	476	351	1 153	268	608	1 095	793	637	279	34
20 to 24 years	559	342	1 585	366	272	525	297	415	618	775	501	285	32
25 to 34 years	888	867	5 237	857	589	1 350	771	1 165	951	1 472	1 024	516	45
35 to 44 years	403	466	2 732	752	499	1 885	387	1 074	922	948	952	295	44
45 to 54 years	210	251	1 333	495	353	1 099	284	749	655	912	792	302	34
55 to 64 years	283	145	758	318	312	608	217	468	305	671	787	274	48
65 to 74 years	207	77	344	176	173	226	142	305	120	399	553	160	26
75 years and over	95	31	139	95	88	106	57	156	48	207	428	103	21
3 and 4 years	107	178	874	146	95	247	149	192	253	306	182	147	5
16 years and over	2 858	2 462	13 275	3 446	2 576	6 714	2 371	4 821	4 499	6 003	5 558	2 151	276
18 years and over	2 781	2 304	12 619	3 243	2 450	6 171	2 265	4 550	4 031	5 680	5 272	2 043	256
21 years and over	2 552	2 113	11 878	2 972	2 214	5 674	2 097	4 249	3 433	5 215	4 939	1 884	239
60 years and over	442	161	779	418	386	563	297	659	287	907	1 355	381	63
62 years and over	393	134	649	367	327	442	260	569	231	776	1 187	333	57
Median	27.1	23.7	26.0	28.9	29.9	29.7	26.6	30.5	20.4	27.5	34.2	25.9	31.0
Female	1 672	1 918	10 231	2 415	1 738	4 858	1 726	3 345	3 682	4 328	3 739	1 596	204
Under 5 years	145	195	1 014	170	110	289	174	229	301	393	222	190	10
5 to 9 years	153	213	1 218	217	137	474	185	289	380	395	257	152	17
10 to 14 years	109	232	982	188	166	530	159	298	503	346	244	130	24
15 to 19 years	113	195	747	239	144	539	133	293	541	382	296	152	19
20 to 24 years	149	175	884	188	133	261	154	221	309	399	254	152	16
25 to 34 years	242	436	2 733	437	314	774	384	618	549	754	541	249	22
35 to 44 years	105	213	1 299	401	239	961	183	545	516	485	487	148	26
45 to 54 years	102	129	637	246	184	538	139	365	345	451	417	147	15
55 to 64 years	167	59	405	155	145	278	99	226	143	351	420	143	23
65 to 74 years	125	49	209	99	95	131	83	172	60	220	313	81	18
75 years and over	62	14	103	75	63	75	33	89	35	144	288	52	14
3 and 4 years	50	77	427	64	38	122	59	95	123	161	84	71	2
16 years and over	1 045	1 226	6 831	1 791	1 288	3 453	1 186	2 471	2 384	3 104	2 954	1 089	149
18 years and over	1 002	1 140	6 506	1 688	1 232	3 190	1 132	2 343	2 151	2 945	2 825	1 031	139
21 years and over	924	1 046	6 137	1 554	1 149	2 960	1 044	2 196	1 857	2 710	2 674	948	129
60 years and over	269	82	473	248	217	320	160	355	145	522	808	189	40
62 years and over	237	74	409	218	187	259	140	307	121	463	712	166	36
Median	26.7	23.8	26.1	29.6	30.9	30.3	26.5	30.8	21.3	28.2	36.2	25.7	31.3
HOUSEHOLD TYPE AND RELATIONSHIP													
Total persons	3 656	3 892	20 241	4 753	3 486	9 556	3 471	6 648	7 084	8 485	7 165	3 178	383
In households	2 728	3 892	20 241	4 683	3 396	9 556	3 462	6 561	7 084	8 369	6 986	3 178	382
Householder	1 013	1 082	6 303	1 523	1 169	2 894	1 065	2 161	1 635	2 608	2 526	1 000	122
Family householder	725	981	5 537	1 327	981	2 641	936	1 946	1 519	2 262	2 084	829	95
Nonfamily householder	288	101	766	196	188	253	129	215	116	346	442	171	27
Living alone	267	77	621	151	166	199	106	189	105	301	404	146	23
Spouse	561	866	4 881	1 178	881	2 346	827	1 785	1 065	1 951	1 837	713	67
Other relatives	1 050	1 873	8 674	1 893	1 298	4 200	1 479	2 548	4 301	3 667	2 518	1 395	184
Nonrelatives	104	71	383	89	48	116	91	67	83	143	105	65	9
Inmate of institution	897	-	-	60	-	-	9	79	-	112	178	-	-
Other, in group quarters	31	-	-	10	90	-	-	-	-	4	1	-	-
Persons per household	2.69	3.60	3.21	3.07	2.91	3.30	3.25	3.04	4.33	3.21	2.77	3.17	3.13
Persons per family	3.22	3.79	3.45	3.31	3.22	3.48	3.46	3.23	4.53	3.48	3.09	3.54	3.64
Persons 65 years and over	303	108	483	273	261	332	199	461	168	606	981	263	47
In households	302	108	483	216	261	332	197	390	168	528	818	263	47
Householder	217	62	303	131	176	172	118	241	91	328	547	178	32
Nonfamily householder	114	20	142	49	74	58	50	67	20	127	212	66	16
Living alone	114	19	137	44	73	53	47	64	20	123	206	64	15
Spouse	62	31	89	45	61	80	45	101	29	101	197	61	5
Other relatives	20	13	82	37	23	77	32	46	48	93	66	22	10
Nonrelatives	3	2	9	3	1	3	2	2	-	6	8	2	-
Inmate of institution	-	-	-	55	-	-	2	71	-	77	163	-	-
Other, in group quarters	-	-	-	-	-	-	-	-	-	1	-	-	-
FAMILY TYPE BY PRESENCE OF OWN CHILDREN													
Families	728	981	5 537	1 327	981	2 641	936	1 946	1 519	2 262	2 084	829	95
With own children under 18 years	385	673	3 784	787	532	1 744	559	1 129	1 070	1 296	1 010	436	43
Number of own children under 18 years	773	1 460	7 154	1 423	958	3 256	1 101	1 983	2 560	2 526	1 763	976	86
Married-couple families	561	866	4 881	1 178	881	2 346	827	1 785	1 065	1 951	1 837	713	67
With own children under 18 years	291	593	3 304	686	481	1 521	493	1 030	761	1 127	867	376	34
Number of own children under 18 years	592	1 300	6 325	1 254	882	2 891	968	1 832	1 848	2 251	1 550	843	66
Female householder, no husband present	126	85	513	121	76	233	84	125	388	230	200	84	23
With own children under 18 years	83	70	393	88	40	183	55	85	277	129	118	49	7
Number of own children under 18 years	164	144	679	150	64	306	114	127	654	220	173	114	17
MARITAL STATUS													
Male, 15 years and over	1 827	1 273	6 626	1 693	1 328	3 395	1 215	2 411	2 216	2 991	2 658	1 098	131
Single	384	277	1 229	363	336	857	238	451	907	697	558	213	34
Now married, except separated	1 255	893	4 969	1 206	902	2 391	867	1 817	1 118	2 045	1 895	744	69
Separated	42	27	71	24	8	23	30	21	72	61	22	33	8
Widowed	26	13	40	19	20	23	17	39	33	54	58	35	10
Divorced	120	63	317	83	54	101	63	83	86	134	125	65	10
Female, 15 years and over	1 065	1 278	7 017	1 840	1 317	3 557	1 208	2 529	2 498	3 186	3 016	1 126	153
Single	135	215	974	314	199	697	150	363	815	555	412	175	33
Now married, except separated	598	892	4 990	1 208	902	2 386	859	1 818	1 120	2 023	1 899	741	72
Separated	42	23	133	23	17	49	30	39	132	73	32	36	8
Widowed	155	56	321	154	125	189	92	178	158	327	451	102	30
Divorced	135	84	599	141	74	236	77	131	273	208	222	70	10

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Arlington city, Tarrant County—Con.												
	Tract 1115.07	Tract 1115.08	Tract 1115.09	Tract 1115.10	Tract 1130	Tract 1131	Tract 1216.01	Tract 1216.04	Tract 1216.05	Tract 1216.06	Tract 1216.07	Tract 1217.01	Tract 1217.02
AGE													
Total persons	5 127	8 998	9 129	10 587	–	16 698	6 081	5 205	3 248	2 190	10 528	5 356	2 940
Under 5 years	562	747	965	1 089	–	939	352	361	168	137	1 091	480	185
5 to 9 years	572	885	1 040	1 163	–	1 103	448	390	183	265	1 183	380	124
10 to 14 years	486	905	812	1 053	–	1 309	646	378	212	317	1 026	280	110
15 to 19 years	361	754	691	840	–	1 377	759	413	302	217	699	435	292
20 to 24 years	284	709	803	912	–	2 455	572	525	284	75	516	817	685
25 to 34 years	1 473	1 933	2 684	2 849	–	4 031	857	1 027	478	305	3 002	1 092	696
35 to 44 years	770	1 477	1 190	1 539	–	2 755	1 116	659	378	518	1 755	449	276
45 to 54 years	366	816	523	647	–	1 513	773	472	486	237	683	394	237
55 to 64 years	178	477	275	336	–	809	392	302	387	83	387	381	169
65 to 74 years	46	198	112	116	–	299	117	222	191	23	126	348	65
75 years and over	29	89	34	43	–	100	49	456	179	13	52	300	101
3 and 4 years	219	287	386	433	–	392	143	120	60	69	451	163	53
16 years and over	3 399	6 314	6 170	7 094	–	13 072	4 501	4 003	2 629	1 415	7 043	4 145	2 483
18 years and over	3 257	5 981	5 866	6 753	–	12 535	4 192	3 835	2 495	1 315	6 735	3 977	2 396
21 years and over	3 100	5 570	5 490	6 298	–	11 587	3 719	3 563	2 332	1 227	6 445	3 647	2 130
60 years and over	146	468	270	290	–	688	312	794	512	64	304	828	233
62 years and over	107	384	220	227	–	556	246	752	440	50	255	763	208
Median	27.5	27.8	26.0	26.0	–	27.8	28.9	30.1	34.9	30.3	28.2	26.9	25.7
Female	2 567	4 539	4 548	5 163	–	8 246	3 001	2 749	1 661	1 127	5 144	2 828	1 446
Under 5 years	284	365	476	534	–	443	155	156	71	80	499	233	88
5 to 9 years	286	453	517	518	–	569	213	178	90	132	563	169	70
10 to 14 years	259	451	399	513	–	643	296	195	108	158	476	136	67
15 to 19 years	169	376	329	377	–	757	371	207	143	107	326	222	156
20 to 24 years	151	367	429	487	–	1 237	273	262	131	34	311	434	330
25 to 34 years	768	1 052	1 400	1 454	–	1 981	455	541	238	181	1 585	538	269
35 to 44 years	352	698	543	733	–	1 287	592	328	215	272	791	225	142
45 to 54 years	161	377	245	288	–	709	371	241	241	111	301	208	117
55 to 64 years	89	235	146	168	–	383	169	146	190	30	193	224	87
65 to 74 years	27	101	58	62	–	170	71	138	114	13	65	202	47
75 years and over	21	58	21	29	–	67	35	357	120	9	34	234	93
3 and 4 years	108	135	174	209	–	173	66	54	22	40	205	79	24
16 years and over	1 686	3 201	3 115	3 508	–	6 425	2 275	2 182	1 365	726	3 521	2 249	1 222
18 years and over	1 610	3 034	2 965	3 366	–	6 154	2 127	2 100	1 304	678	3 364	2 174	1 184
21 years and over	1 544	2 817	2 779	3 155	–	5 628	1 893	1 958	1 227	640	3 245	1 992	1 037
60 years and over	86	248	146	153	–	377	172	554	302	33	165	550	168
62 years and over	65	210	119	125	–	307	147	529	266	28	138	510	153
Median	27.1	27.5	26.0	26.1	–	27.2	30.3	31.8	36.8	29.9	28.1	27.8	25.4
HOUSEHOLD TYPE AND RELATIONSHIP													
Total persons	5 127	8 998	9 129	10 587	–	16 698	6 081	5 205	3 248	2 190	10 528	5 356	2 940
In households	5 127	8 990	9 095	10 587	–	16 690	5 912	4 710	3 095	2 190	10 520	5 094	2 840
Householder	1 553	3 034	2 948	3 268	–	6 965	1 950	1 732	1 165	612	3 274	2 094	1 371
Family householder	1 436	2 513	2 457	2 899	–	4 189	1 655	1 308	926	587	3 012	1 345	707
Nonfamily householder	117	521	491	369	–	2 776	295	424	239	25	262	749	664
Living alone	83	396	350	243	–	2 085	234	323	197	19	203	597	516
Spouse	1 371	2 217	2 156	2 580	–	3 761	1 503	1 076	829	539	2 847	1 036	557
Other relatives	2 120	3 518	3 708	4 465	–	5 100	2 329	1 730	1 034	1 024	4 261	1 703	692
Nonrelatives	83	221	283	274	–	864	130	172	67	15	138	261	220
Inmate of institution	–	–	–	–	–	–	–	495	108	–	–	262	92
Other, in group quarters	–	–	34	–	–	–	169	–	45	–	–	–	8
Persons per household	3.30	2.96	3.09	3.24	–	2.40	3.03	2.72	2.66	3.58	3.21	2.43	2.07
Persons per family	3.43	3.28	3.39	3.43	–	3.12	3.32	3.15	3.01	3.66	3.36	3.04	2.77
Persons 65 years and over	75	287	146	159	–	399	166	478	379	36	178	648	166
In households	75	287	143	159	–	399	166	199	264	36	178	456	74
Householder	37	171	73	81	–	220	98	120	175	16	98	329	47
Nonfamily householder	12	58	17	21	–	85	45	45	74	3	33	186	20
Living alone	12	55	16	20	–	83	43	42	73	3	33	183	20
Spouse	11	71	30	36	–	102	37	49	61	7	35	83	16
Other relatives	27	39	39	42	–	75	31	28	27	12	44	36	10
Nonrelatives	–	6	1	–	–	2	–	2	1	1	1	8	1
Inmate of institution	–	–	–	–	–	–	–	479	106	–	–	192	90
Other, in group quarters	–	–	3	–	–	–	–	–	–	–	–	–	2
FAMILY TYPE BY PRESENCE OF OWN CHILDREN													
Families	1 436	2 513	2 457	2 899	–	4 189	1 655	1 308	926	587	3 012	1 345	707
With own children under 18 years	979	1 586	1 725	1 989	–	2 235	1 010	719	409	439	2 031	708	304
Number of own children under 18 years	1 800	2 878	3 084	3 660	–	3 997	1 805	1 285	679	863	3 660	1 207	481
Married-couple families	1 371	2 217	2 156	2 580	–	3 761	1 503	1 076	829	539	2 847	1 036	557
With own children under 18 years	930	1 352	1 489	1 744	–	1 994	902	560	358	395	1 899	505	230
Number of own children under 18 years	1 701	2 503	2 708	3 244	–	3 642	1 636	1 026	596	776	3 433	901	368
Female householder, no husband present	48	238	238	250	–	301	122	188	79	42	125	252	106
With own children under 18 years	39	196	193	207	–	195	91	137	46	38	104	182	61
Number of own children under 18 years	83	320	309	356	–	290	140	227	77	79	185	278	94
MARITAL STATUS													
Male, 15 years and over	1 769	3 189	3 141	3 684	–	6 748	2 298	1 858	1 293	714	3 614	1 929	1 280
Single	312	666	704	836	–	2 148	650	464	314	153	573	542	492
Now married, except separated	1 384	2 258	2 207	2 622	–	3 839	1 527	1 163	876	540	2 876	1 109	607
Separated	18	35	55	39	–	134	20	41	14	2	30	47	39
Widowed	8	22	13	12	–	30	10	49	26	1	12	44	8
Divorced	47	208	162	175	–	597	91	139	63	18	123	187	134
Female, 15 years and over	1 738	3 264	3 171	3 598	–	6 591	2 337	2 229	1 392	757	3 606	2 287	1 241
Single	223	556	519	539	–	1 844	533	361	228	147	442	447	323
Now married, except separated	1 387	2 253	2 205	2 623	–	3 820	1 530	1 156	870	543	2 882	1 101	573
Separated	12	46	51	57	–	98	27	53	19	9	30	73	43
Widowed	53	128	105	104	–	214	93	408	184	20	89	359	129
Divorced	63	281	291	275	–	615	154	242	91	38	163	307	173

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Arlington city, Tarrant County—Con.												
	Tract 1218	Tract 1219.01	Tract 1219.02	Tract 1220	Tract 1221	Tract 1222	Tract 1223	Tract 1224	Tract 1225	Tract 1226	Tract 1227	Tract 1228	Tract 1229
AGE													
Total persons	285	3 874	5 488	6 906	5 600	1 773	3 486	5 622	3 509	3 979	4 055	6 276	6 184
Under 5 years	9	235	493	521	439	87	108	365	174	186	271	445	530
5 to 9 years	3	216	414	481	433	76	39	245	205	304	253	319	523
10 to 14 years	1	183	350	509	365	70	34	242	279	380	237	346	512
15 to 19 years	19	404	490	704	419	148	673	621	305	478	307	703	603
20 to 24 years	32	855	1 116	951	683	399	1 351	1 374	304	334	535	1 405	771
25 to 34 years	61	885	1 329	1 298	1 100	387	805	1 197	549	497	780	1 167	1 163
35 to 44 years	34	406	563	754	515	126	128	347	437	653	379	574	729
45 to 54 years	18	355	397	806	626	112	77	404	498	580	368	579	688
55 to 64 years	11	212	224	580	580	165	124	391	474	374	503	455	467
65 to 74 years	26	81	76	212	314	133	69	301	193	113	278	189	148
75 years and over	71	42	28	90	126	70	78	135	91	80	144	94	56
3 and 4 years	4	90	169	213	157	31	34	135	70	74	90	150	199
16 years and over	271	3 193	4 150	5 287	4 282	1 516	3 292	4 730	2 779	3 006	3 249	5 075	4 503
18 years and over	264	3 084	3 997	5 005	4 114	1 490	3 241	4 594	2 664	2 803	3 155	4 881	4 238
21 years and over	245	2 657	3 561	4 510	3 847	1 331	2 278	3 816	2 468	2 549	2 899	4 167	3 871
60 years and over	101	197	179	535	687	275	217	609	471	318	647	457	373
62 years and over	100	162	140	426	566	245	188	544	371	263	542	369	295
Median	41.2	25.3	24.5	26.5	28.2	26.8	22.8	24.8	33.8	31.7	29.6	24.7	25.8
Female	147	1 958	2 743	3 409	2 805	868	1 752	2 563	1 850	1 991	2 122	3 012	3 108
Under 5 years	5	112	226	236	190	42	48	199	86	78	136	226	259
5 to 9 years	2	98	197	241	208	42	16	129	102	162	131	162	259
10 to 14 years	1	88	190	246	183	37	18	126	139	173	125	152	262
15 to 19 years	8	225	277	352	214	79	490	240	164	240	161	363	297
20 to 24 years	11	437	562	457	351	182	687	523	153	134	264	628	379
25 to 34 years	20	405	617	614	508	157	234	470	293	262	371	497	564
35 to 44 years	8	209	296	368	259	48	52	171	245	357	194	288	382
45 to 54 years	8	188	191	428	352	48	34	230	265	282	221	311	361
55 to 64 years	6	109	120	272	280	93	72	206	241	182	266	227	228
65 to 74 years	19	54	48	125	181	81	42	172	101	69	154	96	77
75 years and over	59	30	19	70	79	51	59	97	61	52	99	62	38
3 and 4 years	3	39	74	92	57	12	18	84	34	33	52	76	95
16 years and over	139	1 633	2 098	2 632	2 177	726	1 663	2 091	1 489	1 530	1 712	2 426	2 272
18 years and over	136	1 571	2 014	2 487	2 099	712	1 634	2 021	1 421	1 430	1 669	2 327	2 134
21 years and over	129	1 335	1 765	2 246	1 959	633	950	1 759	1 314	1 313	1 525	1 962	1 963
60 years and over	81	124	111	308	378	174	141	363	260	176	371	245	200
62 years and over	80	103	87	258	312	158	127	329	210	153	324	198	165
Median	67.5	25.2	24.2	26.8	29.0	26.9	21.4	25.7	34.6	33.3	30.7	24.7	26.2
HOUSEHOLD TYPE AND RELATIONSHIP													
Total persons	285	3 874	5 488	6 906	5 600	1 773	3 486	5 622	3 509	3 979	4 055	6 276	6 184
In households	189	3 874	5 480	6 906	5 600	1 773	2 848	5 159	3 509	3 979	4 055	6 276	6 184
Householder	117	1 796	2 339	2 547	2 073	918	1 596	2 300	1 353	1 310	1 707	2 697	2 108
Family householder	45	1 005	1 417	1 863	1 661	403	498	1 295	1 075	1 125	1 193	1 586	1 733
Nonfamily householder	72	791	922	684	412	515	1 098	1 005	278	185	514	1 111	375
Living alone	63	602	716	525	328	417	681	703	239	137	428	801	263
Spouse	33	768	1 084	1 585	1 445	300	380	1 033	900	1 004	1 018	1 301	1 415
Other relatives	26	1 042	1 742	2 488	1 914	398	319	1 355	1 186	1 577	1 195	1 832	2 443
Nonrelatives	13	268	315	286	168	157	553	471	70	88	135	446	218
Inmate of institution	88	–	–	–	–	–	11	7	–	–	* –	–	–
Other, in group quarters	8	–	–	–	–	–	627	456	–	–	–	–	–
Persons per household	1.62	2.16	2.34	2.71	2.70	1.93	1.78	2.24	2.59	3.04	2.38	2.33	2.93
Persons per family	2.31	2.80	2.99	3.19	3.02	2.73	2.40	2.84	2.94	3.29	2.85	2.98	3.28
Persons 65 years and over	97	123	104	302	440	203	147	436	284	193	422	283	206
In households	9	123	104	302	440	203	146	434	284	193	422	283	204
Householder	7	79	68	187	287	159	113	311	191	114	278	191	128
Nonfamily householder	4	44	34	92	113	94	76	144	76	43	117	73	42
Living alone	4	44	33	89	111	90	69	139	75	42	116	68	41
Spouse	1	24	18	69	117	33	26	90	56	45	108	63	43
Other relatives	1	20	18	42	35	8	5	32	36	34	35	26	32
Nonrelatives	–	–	–	4	1	3	2	1	1	–	1	3	1
Inmate of institution	86	–	–	–	–	–	–	–	–	–	–	–	–
Other, in group quarters	2	–	–	–	–	–	1	2	–	–	–	–	–
FAMILY TYPE BY PRESENCE OF OWN CHILDREN													
Families	45	1 005	1 417	1 863	1 661	403	498	1 295	1 075	1 125	1 193	1 586	1 733
With own children under 18 years	10	469	821	939	751	133	139	554	470	612	514	759	981
Number of own children under 18 years	15	700	1 371	1 746	1 367	240	183	916	798	1 126	859	1 284	1 771
Married-couple families	33	768	1 084	1 585	1 445	308	398	1 033	900	1 004	1 018	1 301	1 415
With own children under 18 years	7	323	578	761	628	82	95	419	365	540	414	589	756
Number of own children under 18 years	9	491	988	1 435	1 165	151	126	705	636	1 014	701	1 011	1 381
Female householder, no husband present	7	181	259	202	168	70	63	191	148	99	151	205	256
With own children under 18 years	2	125	215	147	106	37	36	121	90	59	94	137	189
Number of own children under 18 years	3	179	342	267	173	68	48	190	142	96	152	228	334
MARITAL STATUS													
Male, 15 years and over	139	1 583	2 093	2 709	2 139	801	1 635	2 661	1 328	1 531	1 566	2 694	2 293
Single	35	564	641	783	484	321	1 071	1 343	307	436	390	1 084	616
Now married, except separated	56	790	1 129	1 647	1 471	334	435	1 093	916	1 017	1 038	1 342	1 445
Separated	12	44	72	46	39	27	25	43	9	10	21	52	39
Widowed	6	13	15	22	18	13	10	22	17	15	28	24	21
Divorced	24	172	236	211	127	106	94	160	79	53	87	192	172
Female, 15 years and over	139	1 657	2 130	2 686	2 224	739	1 670	2 109	1 528	1 578	1 739	2 472	2 326
Single	9	499	486	535	314	206	1 071	593	276	341	297	685	410
Now married, except separated	48	782	1 104	1 621	1 472	309	404	1 063	921	1 020	1 040	1 335	1 444
Separated	5	44	94	70	38	25	22	47	16	20	13	66	70
Widowed	68	91	92	170	209	101	80	208	130	104	182	145	133
Divorced	9	241	354	290	191	98	93	198	180	93	198	241	269

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Totals for split tracts in Tarrant County—Con.											
	Tract 1109.02	Tract 1110.01	Tract 1110.04	Tract 1111.01	Tract 1111.02	Tract 1112.01	Tract 1113.01	Tract 1113.02	Tract 1114	Tract 1115.03	Tract 1115.04	Tract 1115.05
AGE												
Total persons	9 725	1 221	7 488	6 790	5 160	3 329	3 518	7 841	6 691	1 149	8 812	4 996
Under 5 years	772	55	600	538	514	192	240	637	455	80	1 020	256
5 to 9 years	834	57	764	618	607	235	292	749	484	68	913	377
10 to 14 years	825	88	809	590	583	276	318	776	582	108	784	536
15 to 19 years	826	75	738	671	455	336	383	758	691	127	532	555
20 to 24 years	589	46	585	523	367	188	254	616	592	68	572	356
25 to 34 years	2 035	103	1 501	1 121	1 141	448	464	1 377	954	162	2 536	670
35 to 44 years	1 425	125	1 161	834	681	523	537	1 079	922	180	1 322	873
45 to 54 years	1 174	109	573	761	416	493	459	733	829	150	615	682
55 to 64 years	733	139	355	589	224	362	308	472	589	108	311	443
65 to 74 years	324	171	218	331	125	194	187	363	381	63	148	169
75 years and over	188	253	184	214	47	73	68	281	212	35	59	79
3 and 4 years	306	19	240	231	213	72	99	239	176	25	406	108
16 years and over	7 107	1 002	5 160	4 911	3 349	2 542	2 568	5 512	5 028	868	5 983	3 710
18 years and over	6 753	966	4 801	4 635	3 152	2 403	2 409	5 171	4 748	810	5 743	3 456
21 years and over	6 356	936	4 470	4 245	2 939	2 239	2 219	4 805	4 347	752	5 476	3 186
60 years and over	817	492	546	789	267	434	382	846	830	147	325	435
62 years and over	692	464	472	672	222	370	333	753	719	127	278	340
Median	30.1	50.7	26.8	28.9	25.6	34.7	31.2	28.1	30.6	31.8	27.8	32.1
Female	4 868	677	3 839	3 474	2 595	1 688	1 724	3 953	3 302	568	4 343	2 556
Under 5 years	385	28	290	273	266	101	108	297	207	37	477	119
5 to 9 years	407	30	391	299	291	114	139	365	237	28	458	174
10 to 14 years	395	33	412	296	284	141	170	404	281	48	395	261
15 to 19 years	389	28	362	331	207	169	160	359	335	61	263	266
20 to 24 years	313	27	311	268	206	96	131	310	295	34	319	183
25 to 34 years	1 031	56	811	569	597	241	241	712	490	86	1 304	368
35 to 44 years	732	62	552	436	342	267	266	523	465	96	582	469
45 to 54 years	556	52	283	382	194	250	216	353	389	71	302	343
55 to 64 years	355	73	172	296	113	162	148	225	281	50	148	209
65 to 74 years	165	114	120	174	66	103	101	216	194	28	81	106
75 years and over	140	174	135	150	29	44	44	189	128	24	34	58
3 and 4 years	155	8	116	110	111	32	47	118	75	12	202	54
16 years and over	3 592	581	2 664	2 541	1 703	1 298	1 265	2 811	2 513	437	2 981	1 942
18 years and over	3 423	565	2 488	2 406	1 617	1 222	1 196	2 666	2 375	410	2 855	1 819
21 years and over	3 234	554	2 329	2 214	1 519	1 141	1 118	2 477	2 174	383	2 726	1 691
60 years and over	448	325	326	447	138	229	206	516	436	73	179	242
62 years and over	387	313	296	389	119	196	178	460	385	64	154	198
Median	30.1	58.5	27.0	29.6	25.9	34.4	31.7	28.9	31.2	33.1	27.4	33.1
HOUSEHOLD TYPE AND RELATIONSHIP												
Total persons	9 725	1 221	7 488	6 790	5 160	3 329	3 518	7 841	6 691	1 149	8 812	4 996
In households	9 589	1 153	7 371	6 671	5 160	3 319	3 510	7 722	6 634	1 149	8 800	4 996
Householder	3 157	516	2 345	2 100	1 504	1 131	1 136	2 466	2 338	387	2 833	1 732
Family householder	2 826	331	2 067	1 830	1 346	1 016	990	2 123	1 899	322	2 563	1 410
Nonfamily householder	331	185	278	270	158	115	146	343	439	65	270	322
Living alone	264	178	253	225	135	106	131	301	390	54	223	281
Spouse	2 583	303	1 811	1 586	1 159	958	900	1 910	1 678	291	2 413	1 225
Other relatives	3 700	322	3 137	2 846	2 417	1 204	1 431	3 235	2 472	447	3 451	1 954
Nonrelatives	149	12	78	139	80	26	43	111	146	24	103	85
Inmate of institution	132	68	117	119	–	–	–	119	57	–	–	–
Other, in group quarters	4	–	–	–	–	1	–	–	–	–	12	–
Persons per household	3.04	2.23	3.14	3.18	3.43	2.93	3.09	3.13	2.84	2.97	3.11	2.88
Persons per family	3.22	2.89	3.39	3.42	3.66	3.13	3.35	3.42	3.19	3.29	3.29	3.25
Persons 65 years and over	512	424	402	545	172	267	255	644	598	98	207	248
In households	393	359	294	430	172	267	255	539	541	98	207	248
Householder	216	260	174	277	96	154	150	348	362	69	118	163
Nonfamily householder	65	153	54	88	23	44	47	146	143	27	37	92
Living alone	59	150	53	82	23	44	46	143	141	26	36	91
Spouse	97	80	78	102	44	78	67	130	136	22	53	48
Other relatives	75	16	37	45	31	34	38	57	39	6	36	37
Nonrelatives	5	3	5	6	1	1	–	4	4	1	–	–
Inmate of institution	118	65	108	115	–	–	–	105	52	–	–	–
Other, in group quarters	1	–	–	–	–	–	–	–	–	–	–	–
FAMILY TYPE BY PRESENCE OF OWN CHILDREN												
Families	2 826	331	2 067	1 830	1 346	1 016	990	2 123	1 899	322	2 563	1 410
With own children under 18 years	1 606	123	1 379	1 007	916	488	549	1 249	975	170	1 616	837
Number of own children under 18 years	2 813	232	2 534	1 925	1 840	862	985	2 441	1 711	311	2 939	1 486
Married-couple families	2 583	303	1 811	1 586	1 159	958	900	1 910	1 678	291	2 413	1 225
With own children under 18 years	1 450	116	1 193	856	787	458	503	1 140	865	151	1 506	693
Number of own children under 18 years	2 579	222	2 243	1 655	1 601	811	914	2 255	1 540	278	2 761	1 270
Female householder, no husband present	177	22	208	184	146	44	68	161	153	24	107	153
With own children under 18 years	124	6	159	118	103	22	35	87	84	14	79	128
Number of own children under 18 years	192	9	250	220	185	40	55	149	137	21	135	191
MARITAL STATUS												
Male, 15 years and over	3 613	435	2 569	2 438	1 702	1 285	1 353	2 792	2 598	449	3 062	1 825
Single	723	78	544	580	388	238	309	608	572	96	454	466
Now married, except separated	2 678	309	1 848	1 644	1 192	970	926	1 979	1 743	302	2 445	1 245
Separated	42	2	34	39	22	13	23	29	50	6	30	10
Widowed	48	30	28	43	19	16	16	56	61	9	18	20
Divorced	122	16	115	132	81	48	79	120	167	30	115	84
Female, 15 years and over	3 681	586	2 746	2 606	1 754	1 332	1 307	2 887	2 577	458	3 038	2 008
Single	516	98	427	463	286	208	186	430	369	87	332	412
Now married, except separated	2 658	310	1 846	1 641	1 202	975	926	1 969	1 728	298	2 443	1 237
Separated	50	9	34	50	37	12	21	35	41	11	32	29
Widowed	260	152	219	271	86	81	104	298	237	36	101	148
Divorced	197	17	220	181	143	56	70	155	202	18	125	176

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Totals for split tracts in Tarrant County—Con.											
	Tract 1115.06	Tract 1115.07	Tract 1115.10	Tract 1130	Tract 1131	Tract 1132.05	Tract 1132.06	Tract 1133.01	Tract 1133.02	Tract 1134.03	Tract 1134.06	Tract 1135.05
AGE												
Total persons	4 789	6 088	10 587	5 518	16 792	6 568	4 441	4 251	4 190	3 539	9 801	4 088
Under 5 years	271	620	1 089	482	949	313	282	190	287	159	758	229
5 to 9 years	347	638	1 163	441	1 115	465	330	234	309	257	669	307
10 to 14 years	414	587	1 053	506	1 316	568	405	288	303	393	710	415
15 to 19 years	456	472	840	592	1 382	591	427	385	351	410	919	464
20 to 24 years	471	341	912	481	2 472	380	397	274	454	244	1 287	336
25 to 34 years	789	1 586	2 849	971	4 047	869	770	448	725	424	1 715	608
35 to 44 years	731	946	1 539	864	2 771	914	557	509	483	603	1 195	730
45 to 54 years	667	491	647	570	1 516	1 040	533	620	422	531	1 162	545
55 to 64 years	413	265	336	382	820	850	368	729	432	346	816	250
65 to 74 years	157	88	116	130	303	348	265	431	219	119	389	112
75 years and over	73	54	43	91	101	222	107	143	205	53	181	92
3 and 4 years	124	244	433	195	395	147	106	93	115	75	274	93
16 years and over	3 679	4 113	7 094	3 960	13 144	5 098	3 346	3 451	3 229	2 646	7 525	3 034
18 years and over	3 475	3 922	6 753	3 721	12 605	4 823	3 173	3 289	3 086	2 471	7 172	2 846
21 years and over	3 198	3 712	6 298	3 377	11 650	4 532	2 908	3 097	2 848	2 270	6 500	2 610
60 years and over	384	245	290	376	698	934	535	918	623	285	888	295
62 years and over	305	195	227	302	566	770	455	768	539	224	747	258
Median	30.4	28.0	26.0	27.6	27.8	35.9	29.8	41.1	29.7	32.5	27.9	29.9
Female	2 481	3 057	5 168	2 729	8 295	3 391	2 293	2 208	2 227	1 803	4 978	2 078
Under 5 years	137	314	534	238	448	159	128	89	149	86	361	117
5 to 9 years	175	310	518	201	576	227	169	122	153	123	327	144
10 to 14 years	221	307	513	251	645	291	208	147	164	192	341	212
15 to 19 years	219	230	377	310	758	297	214	190	195	207	483	224
20 to 24 years	254	179	487	224	1 246	166	196	132	232	125	643	165
25 to 34 years	409	833	1 454	515	1 987	479	390	236	356	209	851	322
35 to 44 years	401	442	733	416	1 298	472	292	271	255	336	630	375
45 to 54 years	325	224	288	264	709	532	272	316	227	263	595	261
55 to 64 years	193	133	168	180	389	417	200	374	220	160	407	117
65 to 74 years	96	48	62	70	171	188	150	238	117	70	221	69
75 years and over	51	37	29	60	68	163	74	93	159	32	119	72
3 and 4 years	66	122	209	90	174	69	51	44	53	39	127	49
16 years and over	1 919	2 058	3 508	1 967	6 460	2 658	1 745	1 802	1 728	1 358	3 879	1 555
18 years and over	1 818	1 958	3 366	1 857	6 188	2 517	1 660	1 726	1 651	1 272	3 703	1 462
21 years and over	1 673	1 866	3 155	1 682	5 659	2 383	1 538	1 632	1 520	1 167	3 341	1 354
60 years and over	214	140	153	197	381	506	314	497	369	154	517	176
62 years and over	173	113	125	162	311	440	269	423	330	124	442	163
Median	30.8	27.6	26.1	27.9	27.2	36.5	31.3	42.3	30.8	33.2	28.6	31.0
HOUSEHOLD TYPE AND RELATIONSHIP												
Total persons	4 789	6 088	10 587	5 518	16 792	6 568	4 441	4 251	4 190	3 539	9 801	4 088
In households	4 789	6 088	10 587	5 437	16 792	6 432	4 441	4 251	4 019	3 539	9 783	3 995
Householder	1 807	1 866	3 268	1 849	7 000	2 218	1 631	1 576	1 505	1 178	3 757	1 339
Family householder	1 328	1 711	2 899	1 401	4 217	1 936	1 284	1 347	1 177	1 022	2 822	1 101
Nonfamily householder	479	155	369	448	2 783	282	347	229	328	156	935	238
Living alone	384	116	243	370	2 091	236	296	204	282	133	752	187
Spouse	1 155	1 623	2 580	1 141	3 784	1 753	1 102	1 207	983	904	2 343	968
Other relatives	1 692	2 504	4 465	2 287	5 139	2 363	1 613	1 423	1 429	1 406	3 361	1 607
Nonrelatives	135	95	274	160	869	98	95	45	102	51	322	81
Inmate of institution	–	–	–	73	–	128	–	–	171	–	11	92
Other, in group quarters	–	–	–	–	–	–	–	–	–	–	7	1
Persons per household	2.65	3.26	3.24	2.94	2.40	2.90	2.72	2.70	2.67	3.00	2.60	2.98
Persons per family	3.14	3.41	3.43	3.45	3.12	3.13	3.11	2.95	3.05	3.26	3.02	3.34
Persons 65 years and over	238	142	159	221	404	578	372	574	424	172	570	204
In households	230	142	159	161	404	466	372	574	268	172	570	123
Householder	136	80	81	86	224	272	239	337	171	98	380	68
Nonfamily householder	53	24	21	25	86	84	103	93	69	36	173	22
Living alone	53	23	20	23	84	82	100	86	66	36	165	21
Spouse	55	32	36	34	102	122	93	178	67	41	133	32
Other relatives	37	29	42	38	75	69	37	56	26	32	50	23
Nonrelatives	2	1	–	3	3	3	3	3	4	1	7	–
Inmate of institution	–	–	–	60	–	104	–	–	156	–	–	81
Other, in group quarters	–	–	–	–	–	–	–	–	–	–	–	–
FAMILY TYPE BY PRESENCE OF OWN CHILDREN												
Families	1 328	1 711	2 899	1 401	4 217	1 936	1 284	1 347	1 177	1 022	2 822	1 101
With own children under 18 years	701	1 134	1 989	810	2 250	910	669	496	574	554	1 458	667
Number of own children under 18 years	1 250	2 077	3 660	1 568	4 021	1 627	1 178	885	1 001	1 015	2 403	1 154
Married-couple families	1 155	1 623	2 580	1 141	3 784	1 753	1 102	1 207	983	904	2 343	968
With own children under 18 years	585	1 075	1 744	654	2 006	804	552	442	450	475	1 145	584
Number of own children under 18 years	1 066	1 963	3 244	1 285	3 663	1 456	1 002	799	808	892	1 946	1 018
Female householder, no husband present	149	65	250	206	303	146	146	118	162	95	382	104
With own children under 18 years	105	47	207	140	196	87	99	42	102	69	255	72
Number of own children under 18 years	164	95	356	259	291	146	150	70	155	111	371	121
MARITAL STATUS												
Male, 15 years and over	1 809	2 117	3 684	2 042	6 786	2 500	1 636	1 689	1 530	1 328	3 715	1 532
Single	473	391	836	564	2 157	519	358	343	322	326	898	400
Now married, except separated	1 167	1 640	2 622	1 190	3 862	1 795	1 118	1 235	1 028	923	2 394	991
Separated	27	20	39	72	134	29	23	24	31	7	80	18
Widowed	13	11	12	38	32	38	29	22	29	13	36	21
Divorced	129	55	175	178	601	119	108	65	120	59	307	102
Female, 15 years and over	1 948	2 126	3 598	2 039	6 626	2 714	1 788	1 850	1 761	1 402	3 949	1 605
Single	396	299	539	424	1 847	442	288	264	266	277	682	308
Now married, except separated	1 169	1 645	2 623	1 171	3 843	1 784	1 118	1 240	1 022	922	2 399	987
Separated	37	15	57	99	98	40	28	20	34	16	85	36
Widowed	121	84	104	131	219	278	176	217	239	85	274	139
Divorced	225	83	275	214	619	170	178	109	200	102	509	135

Table P-1. General Characteristics of Persons: 1980—Con.

[For meaning of symbols, see Introduction. For definitions of terms, see appendixes A and B]

Census Tracts	Totals for split tracts in Tarrant County—Con.				Wise County					
	Tract 1142.02	Tract 1219.02	Tract 1225	Tract 1226	Tract 1501	Tract 1502	Tract 1503	Tract 1504	Tract 1505	Tract 1506
AGE										
Total persons	3 195	5 529	3 509	3 979	3 465	4 104	1 405	6 961	3 737	6 900
Under 5 years	216	494	174	186	227	316	101	467	329	422
5 to 9 years	247	415	205	304	285	336	118	535	294	570
10 to 14 years	293	351	279	380	305	280	118	620	279	672
15 to 19 years	304	494	305	478	381	293	132	635	330	642
20 to 24 years	218	1 126	304	334	208	312	84	465	384	433
25 to 34 years	415	1 342	549	497	449	576	182	922	560	955
35 to 44 years	508	573	437	653	471	404	149	931	332	960
45 to 54 years	417	405	498	580	403	337	136	795	346	816
55 to 64 years	327	225	474	374	326	366	158	713	354	665
65 to 74 years	169	76	193	113	252	417	116	558	290	497
75 years and over	81	28	91	80	158	467	111	320	239	271
3 and 4 years	96	170	70	74	90	116	49	195	113	171
16 years and over	2 380	4 196	2 779	3 006	2 572	3 112	1 043	5 206	2 782	5 102
18 years and over	2 244	4 041	2 664	2 803	2 401	2 993	985	4 939	2 652	4 832
21 years and over	2 098	3 602	2 468	2 549	2 230	2 806	915	4 600	2 426	4 485
60 years and over	378	179	471	318	562	1 069	306	1 243	712	1 077
62 years and over	330	140	371	263	505	992	278	1 108	636	935
Median	32.8	24.5	33.8	31.7	32.2	33.7	33.4	33.4	29.5	32.4
Female	1 584	2 756	1 850	1 991	1 706	2 206	706	3 478	1 912	3 434
Under 5 years	101	226	86	78	115	145	55	209	158	208
5 to 9 years	116	198	102	162	130	175	62	276	146	286
10 to 14 years	136	191	139	173	142	134	48	321	138	333
15 to 19 years	163	280	164	240	187	145	59	316	152	293
20 to 24 years	100	564	153	134	92	160	44	233	193	209
25 to 34 years	211	619	293	262	227	279	86	475	261	504
35 to 44 years	267	298	245	357	240	202	78	457	178	467
45 to 54 years	196	193	265	282	191	180	67	382	169	397
55 to 64 years	159	120	241	182	166	210	83	342	200	313
65 to 74 years	83	48	101	69	132	239	63	284	162	273
75 years and over	52	19	61	52	84	335	61	177	155	151
3 and 4 years	52	74	34	33	40	57	26	86	60	80
16 years and over	1 204	2 109	1 489	1 530	1 280	1 728	529	2 594	1 442	2 541
18 years and over	1 125	2 023	1 421	1 430	1 196	1 671	505	2 465	1 377	2 414
21 years and over	1 052	1 773	1 314	1 313	1 116	1 560	473	2 297	1 282	2 266
60 years and over	198	111	260	176	298	678	162	641	423	586
62 years and over	173	87	210	153	265	638	149	563	384	503
Median	33.3	24.2	34.6	33.3	33.3	37.4	34.9	33.4	31.5	32.7
HOUSEHOLD TYPE AND RELATIONSHIP										
Total persons	3 195	5 529	3 509	3 979	3 465	4 104	1 405	6 961	3 737	6 900
In households	3 135	5 529	3 509	3 979	3 465	3 944	1 405	6 961	3 645	6 900
Householder	1 076	2 375	1 353	1 310	1 158	1 549	511	2 502	1 327	2 364
Family householder	915	1 424	1 075	1 125	998	1 103	394	2 077	1 027	1 978
Nonfamily householder	161	951	278	185	160	446	117	425	300	386
Living alone	139	744	239	137	152	424	111	404	273	360
Spouse	816	1 090	900	1 004	920	942	354	1 925	909	1 823
Other relatives	1 192	1 745	1 186	1 577	1 356	1 375	532	2 463	1 315	2 621
Nonrelatives	51	319	70	88	31	78	8	71	94	92
Inmate of institution	60	-	-	-	-	159	-	-	90	-
Other, in group quarters	-	-	-	-	-	1	-	-	2	3
Persons per household	2.91	2.33	2.59	3.04	2.99	2.55	2.75	2.78	2.75	2.92
Persons per family	3.19	2.99	2.94	3.29	3.28	3.10	3.25	3.11	3.17	3.25
Persons 65 years and over	258	104	284	193	418	884	227	878	529	768
In households	200	104	284	193	410	733	227	878	444	767
Householder	127	68	191	114	257	524	160	582	311	503
Nonfamily householder	37	34	76	43	86	257	75	227	145	206
Living alone	34	33	75	42	85	257	75	226	142	201
Spouse	55	18	56	45	116	173	57	243	103	198
Other relatives	16	18	36	34	36	35	10	50	28	59
Nonrelatives	2	-	1	-	1	1	-	3	2	7
Inmate of institution	50	-	-	-	-	150	-	-	85	-
Other, in group quarters	-	-	-	-	-	1	-	-	-	1
FAMILY TYPE BY PRESENCE OF OWN CHILDREN										
Families	915	1 424	1 075	1 125	998	1 103	394	2 077	1 027	1 978
With own children under 18 years	476	824	470	612	495	495	190	989	524	983
Number of own children under 18 years	875	1 374	798	1 126	987	980	391	1 851	993	1 882
Married-couple families	816	1 090	900	1 004	920	942	354	1 925	909	1 823
With own children under 18 years	412	580	365	540	461	416	172	911	461	910
Number of own children under 18 years	770	990	636	1 014	941	834	365	1 709	901	1 751
Female householder, no husband present	68	268	140	99	39	127	28	98	96	118
With own children under 18 years	45	216	90	59	19	63	12	50	52	55
Number of own children under 18 years	76	343	142	96	26	125	18	100	73	98
MARITAL STATUS										
Male, 15 years and over	1 208	2 128	1 328	1 531	1 329	1 422	527	2 678	1 365	2 632
Single	238	655	307	436	281	281	116	485	278	543
Now married, except separated	837	1 136	916	1 017	949	1 000	365	1 969	962	1 882
Separated	22	74	9	10	9	24	5	17	10	34
Widowed	30	17	17	15	44	48	18	71	37	46
Divorced	81	246	79	53	46	69	23	131	78	127
Female, 15 years and over	1 231	2 141	1 522	1 578	1 319	1 758	541	2 666	1 478	2 607
Single	183	488	276	341	200	217	70	319	165	336
Now married, except separated	832	1 110	921	1 020	945	978	363	1 956	939	1 843
Separated	21	94	16	20	14	33	5	27	24	26
Widowed	104	92	130	104	117	425	77	270	247	275
Divorced	91	357	180	93	43	97	26	94	95	107

Air and On-site Population Targets

(Est) Worksheet

Distance From Site (Miles)	Census Tract #	Percentage Of Tract Between Site Distances	Population Between Site Distances	Total Population
0 → 1/4	~~1217.02~~	~~10~~	~~0~~	
	1218	10	29	
	1220	10	691	
	1221	10	560	1,280
1/4 → 1/2	1217.02	10	294	
	1218	10	29	
	1220	20	1,381	
	1221	15	840	2,544
0 → 1/2				3,824
1/2 → 1	1217.02	60	1,764	
	1218	20	57	
	1219.02	10	553	
	1220	70	4,834	
	1221	60	3,360	10,568
	~~1220~~	~~60~~	~~0~~	
	~~1223~~	~~60~~	~~0~~	
0 → 1				14,392
1 → 2	1130	20	1,102	
	1131	10	1,679	
	1217.01	75	4,017	
	1217.02	30	882	
	1218	50	142	
	1219.01	100	3,874	

Air and On-site Population Targets

(Est) Worksheet

Distance From Site (Miles)	Census Tract #	Percentage Of Tract Between Site Distances	Population Between Site Distances	Total Population
1→2 (con't)	1219.02	70	3,870	
	~~1220~~			
	1221	15	840	
	1222	70	1,241	
	1223	65	2,266	
	1224	30	1,687	
	1228	35	2,197	
	1229	95	5,875	29,672
0→2				44,064
2→3	154	20	1,726	
	161	55	1,652	
	1115.03	5	57	
	1115.09	20	1,826	
	1115.10	50	5,294	
	1130	40	2,204	
	1131	25	4,198	
	1216.05	95	3,086	
	1217.01	25	1,339	
	1218	10	28	
	1219.02	20	1,106	
	1222	30	532	
	1223	35	1,220	
	1224	70	3,935	
	1227	75	3,041	
	1228	65	4,079	

Air and On-site Population Targets

(Est) Worksheet

Distance From Site (Miles)	Census Tract #	Percentage Of Tract Between Site Distances	Population Between Site Distances	Total Population
2→3 (con't)	1229	5	309	35,632
0→3				79,696
3→4	154	75	6,473	
	155	60	1,669	
	160	65	3,940	
	161	45	1,352	
	162	35	2,146	
	164	5	1,012	
	1115.03	5	57	
	1115.06	5	239	
	1115.08	35	3,147	
	1115.09	60	5,477	
	1115.10	50	5,293	
	1130	20	1,102	
	1131	35	5,877	
	1216.01	25	1,520	
	1216.04	95	4,945	
	1216.05	5	162	
	1225	100	3,509	
	1226	80	3,183	
	1227	25	1,014	52,117
0→4				131,813

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Rene Del Rosa Secretary, Flood Plain Management Office U.S. Army Corp of Engineers Ft. Worth, Texas (817) 334-3207	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/23/89 10:50 AM
SUBJECT: G.M. ASSEMBLY - PA (TXD008018004)		
SUMMARY OF COMMUNICATION		
The entire G. M. Assembly facility is outside the 500-year floodplain		
(classification is Zone X).		
Floodplain reference is from Panel 485454-0009C and is dated February 4,		
1988.		
CONCLUSIONS, ACTION TAKEN OR REQUIRED		
INFORMATION COPIES TO:		

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref 5

Interim Remedial Action Plan

Arlington, Texas Plant

General Motors Corporation
C•P•C Division

March 1987

HDR Infrastructure
A Centerra Company

GM ARLINGTON PAINT MIX
INTERIM REMEDIAL ACTION PLAN

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

General Motors (GM) has operated an automobile assembly plant in Arlington, Texas for the past 40 years. A centralized paint mixing and storage facility is utilized to support the plant. A spill of paint thinner occurred in early December, 1986 and contaminated soil in an adjacent excavation pit which had been dug for a new loading dock. Spilled thinner entered a perched water layer adjacent to the Paint Mix Building and began seeping into the excavation whenever the pit was pumped down. Samples of the pit seepage indicated heavy contamination with volatile organic compounds including toluene, xylenes and methyl ethyl ketone. Once these results were obtained, GM hired HDR Infrastructure to initiate a comprehensive sampling survey to identify the nature and extent of contamination and to determine the most feasible remedial action to implement.

The GM plant is situated in a relatively flat area of east Arlington with surface drainage from the plant discharging into a city storm sewer system. Geology of the area includes a 30 to 40 foot layer of tan and silty clay situated over a 100 foot thick Woodbine Formation. Groundwater is present in small quantities on top of the Eagle Ford Shale and in large quantities in the Woodbine Formation. Due to site drainage, rainwater collects and is trapped on top of the clay layer in the fill directly underneath existing concrete drives around the Paint Mix Building. This trapped or perched water layer remains stationary until it is pumped out or gravity drained. Perched water has been detected primarily in the area immediately north of the new dock. Under normal conditions, the perched layer remains trapped and immobile.

Groundwater and soil sampling was conducted to determine the extent and nature of the contaminants. Results of the sampling indicated that no significant inorganic contamination has occurred. Significant volatile organic contamination was detected in perched water and soil located in an area west of the building around the excavation pit. Samples of groundwater from the top of the Eagle Ford Shale did not show significant contamination. Soil contaminants appear to be restricted to the top 10 feet of soil. Primary area of contamination appears to be restricted to the area immediately adjacent to the west loading dock.

Evaluations of potential sources of contamination revealed that the December, 1986 thinner spill was the primary source. Three (3) potential pathways of migration were identified including:

- Drain and waste pipeline gravel bedding
- Railroad spur gravel bedding
- Building foundations

Current sampling results indicate that the contaminants are confined to an area immediately around the new loading dock.

No inorganic remediation is proposed due to the low levels of inorganic contamination detected. Remediation of the solvent contamination is proposed in two phases with the first phase addressing cleanup of all mobile volatile organic compounds (VOC's) in the perched water layer and the second

phase concerned with remediation of all remaining VOC contamination. This two phase approach was developed to allow for immediate removal of the perched layer contaminants which pose a threat of spreading contamination by water movement and dilution. Until the perched water layer VOC's are removed, final soil VOC levels cannot be determined and therefore, a soil remediation program cannot be developed. Once the first phase is completed, a second phase remedial action plan will be submitted to the Texas Water Commission (TWC) for review.

The proposed first phase remedial action plan includes the following features:

- Continuous removal of perched groundwater through a french drain system installed along the West Paint Mix Loading Dock.
- Removal of water VOC's by an air stripping system to levels below proposed RMCL's (1986 SDWA Amendments).
- Disposal of the treated water to General Motor's industrial wastewater pretreatment plant.
- Monitoring of air stripping system performance and collected water VOC levels by analytical testing methods.
- Continuous operation of the air stripper until perched ground water VOC levels are below proposed RMCL's for at least one continuous month.
- Continuous groundwater removal and disposal until completion of second phase remedial plan.
- Migration pathway evaluation studies and investigations will be conducted.
- Monthly status reports to TWC.
- Additional soil sampling for VOC's, after water VOC's have been removed, to provide a complete picture of soil contamination.
- Submission of second phase remedial plan addressing soil remediation with 60 days of completion of the Phase I Plan.

GM proposes to implement the perched water VOC treatment system within 30 days of receipt of approval from the Texas Water Commission.

II. INTRODUCTION

A. Background

General Motors Chevrolet-Pontiac-Canada (C-P-C) Division operates an automobile assembly plant in Arlington, Texas. The plant is located at the northwest intersection of State Highway 360 and Abrams Road (Refer to Figure II A.1). GM has operated at this site for approximately 40 years.

Major manufacturing operations at the plant include the assembly of prefabricated components and painting of metallic body components. Painting is accomplished through a number of steps including metal preparation, priming, and multi-layer color coating. To support the painting operation, GM utilizes a Paint Mix Building to store bulk paints and paint thinners. The Paint Mix Building is located adjacent to the west side of the main assembly building (Figure II-A-1). Deliveries of new paints are made at a loading dock located on the south side of the building.

Due to the construction of a new thermal oxidizer for volatile organic compound (VOC) air abatement, GM began construction of a new dock on the west side of the building. Excavation for the new dock was begun in late November, 1986. The excavated pit was approximately 10 x 20 x 6' deep.

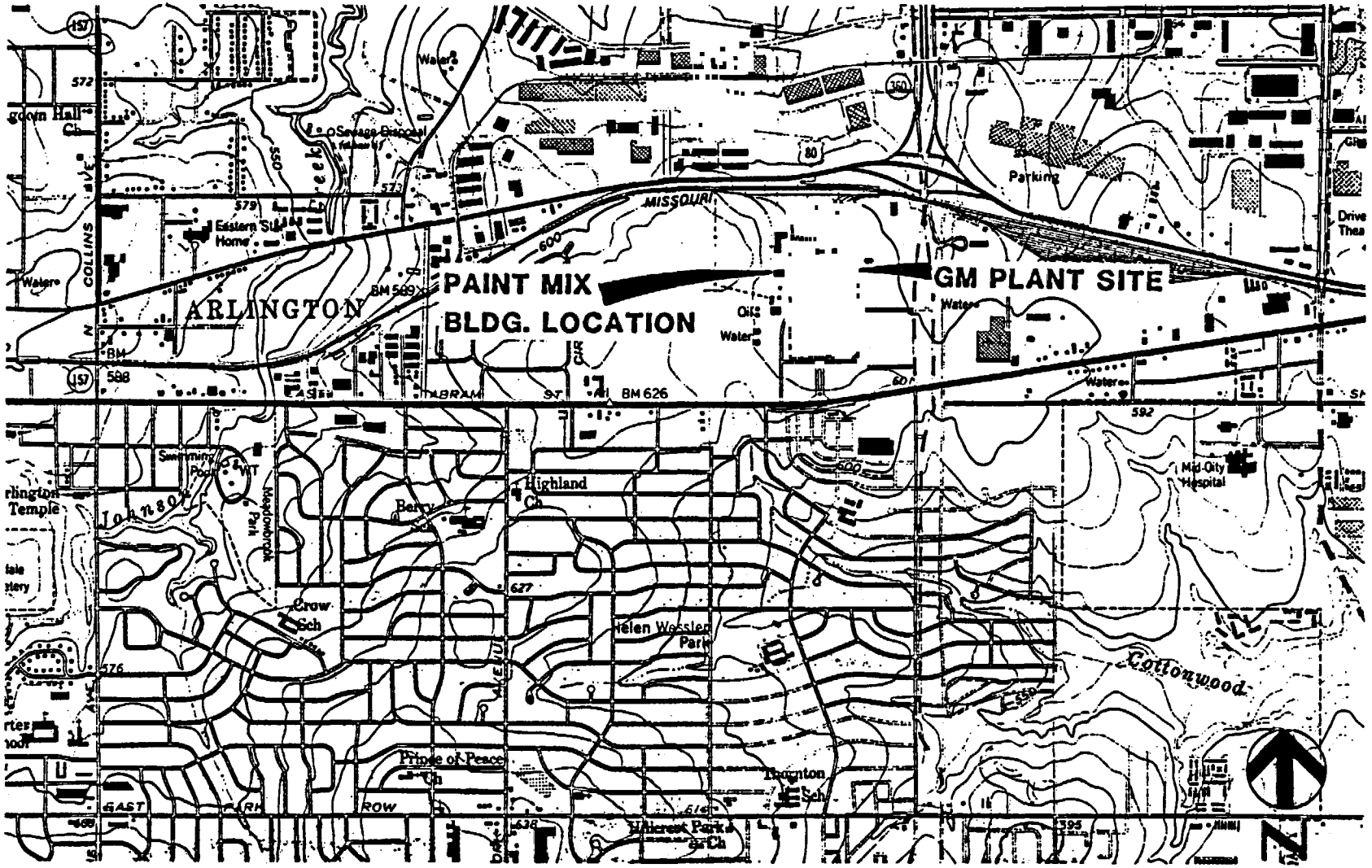
A spill of paint thinner occurred in the Paint Mix Building and subsequently collected in the open excavation pit. GM notified the TWC during the first week in December and proceeded to clean up the spill by removing all liquid thinner and contaminated soil. After the spill had been cleaned up, GM personnel noticed that water was seeping into the excavation and had a "solvent" smell. As a result, a grab sample of the water was obtained on December 8th and analyzed by Southwestern Laboratories (SWL) for organics. In addition, samples of the excavation subgrade soil were collected and analyzed. Results of the analyses indicated that the seepage water was heavily contaminated with thinner components including toluene, xylenes, and methyl ethyl ketone.

Once these initial sampling results were obtained, GM hired HDR Infrastructure (HDR) to initiate a comprehensive sampling survey to determine the extent of vertical and horizontal migration of the contaminants and to determine the most feasible remedial action to implement.

B. Site Physiography

1. General

The GM Plant is located in Arlington, Texas which has a relatively flat rolling topography (Refer to Figure II-A-1). As illustrated in Figure II-A-1, maximum relief, within a one-mile radius of the plant, is approximately 80 feet. The highest point, 630 feet above mean sea level (MSL), is located west of the plant along Circle Drive. The lowest point, 550 feet above MSL, is located southeast of the plant in an area east of State Highway 360 between Abrams and East Park Row Boulevards. The plant is situated on relatively flat land at an elevation of approximately 603 feet above MSL. In general, relief increases to the west and southwest and decreases



SCALE: 1" = 2400'

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LOCATION MAP

FIGURE II-A-1

to the north, east and southeast.

The plant is located within the Trinity River Drainage Basin. The area north of the plant is drained by the West Fork of the Trinity River. The area south and east of the plant is drained by Cottonwood Creek, which empties into Mountain Creek Lake. The lake is situated in Grand Prairie, Texas approximately 6 miles east of the plant.

Surface drainage from the plant is collected and discharged into the City of Arlington's storm sewer collection system located on the north side of the property.

2. Site Specific Physiography

The Paint Mix Building is bounded on the east by the main assembly building, on the south by miscellaneous utility buildings, on the west by open areas and on the north by warehousing and salvage buildings. Topography of the areas north and south of the Paint Mix Building is similar to the area around the Paint Mix Building. The area immediately to the west rises approximately 10 to 15 feet above the ground elevation at the Paint Mix Building.

Surface elevations around the west end of the Paint Mix Building vary from 603 feet above MSL at the south end to 602 feet above MSL at the north end. Drainage around the Paint Mix Building is directed west to the railroad spur where the drainage is directed northward along the railroad bed to a storm sewer inlet. Runoff from the high area west of the Paint Mix Building is intercepted by a drainage culvert located at the base of the rise and directed northward.

A spur of the plant railroad system had, until recently, run along the west side of the Paint Mix Building (Figure II-C-1). The rails and ballast were removed several years ago but, the gravel base was left in the ground.

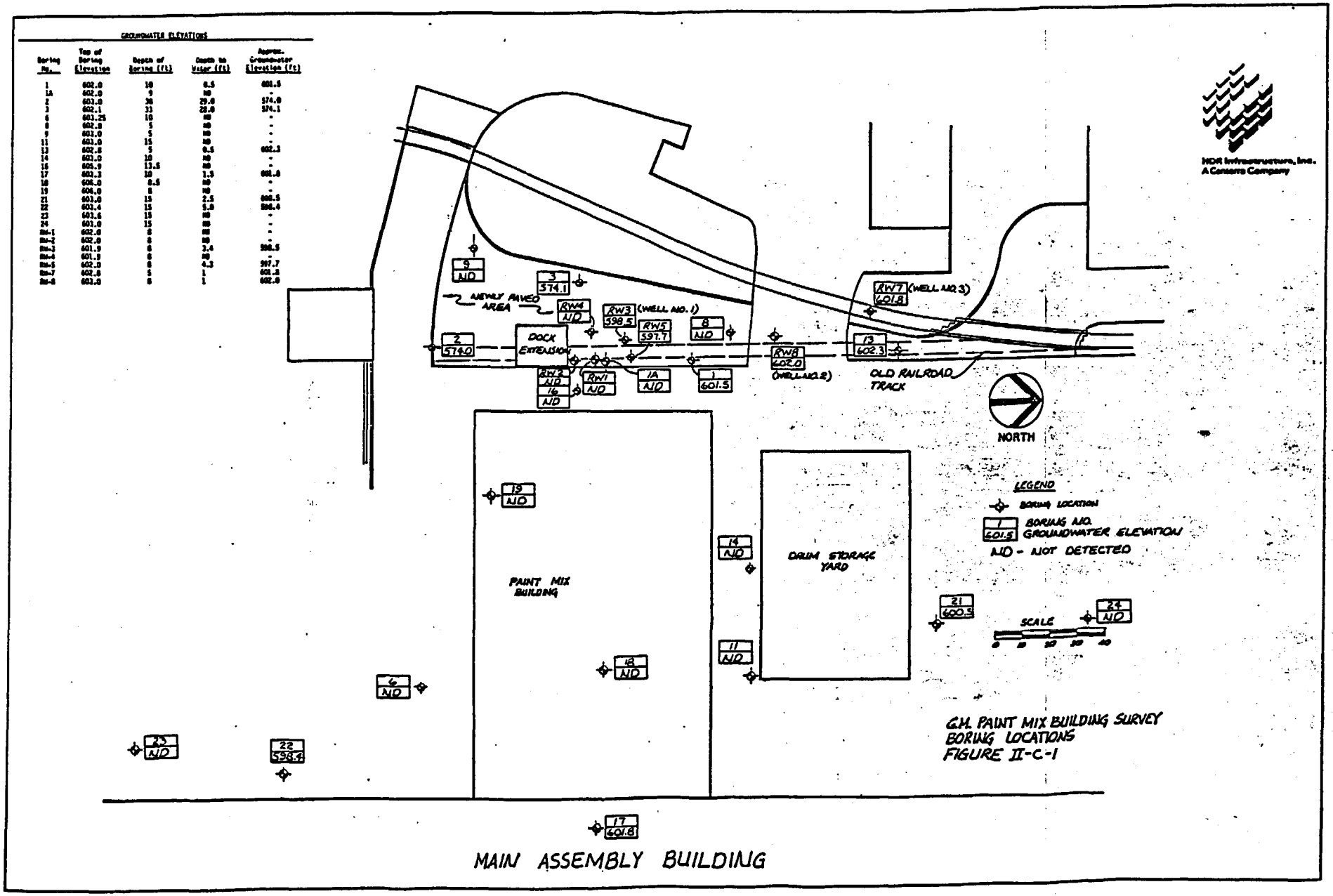
C. SITE HYDROGEOLOGY

1. General

Geology of the Arlington area consists of two cretaceous system formations, including the Woodbine and Eagle Ford Groups. The Eagle Ford Group is approximately 100 feet thick and overlies the Woodbine Group which is approximately 300 feet thick. The Eagle Ford Group consists of shale, limestone, clay and marl and yields only small amounts of water in localized areas (TDWR Report 269, 1982). The Woodbine Group is composed of friable, ferruginous, fine-grained sand and sandstone with interbedded shale, sandy shale, and laminated clay. The upper part of the Woodbine displays a marked increase in shale and clay, while the lower portion exhibits a more sandy make-up.

GROUNDWATER ELEVATIONS

Boring No.	Top of Boring Elevation	Depth of Boring (ft)	Depth to Water (ft)	Approx. Groundwater Elevation (ft)
1	602.0	10	8.5	601.5
1A	602.0	9	ND	-
2	603.0	30	29.0	574.0
3	602.1	33	28.0	574.1
4	603.25	10	ND	-
5	602.0	5	ND	-
6	602.0	5	ND	-
7	603.0	15	ND	-
8	602.5	5	8.5	602.1
9	603.0	20	ND	-
10	603.5	13.5	ND	-
11	603.1	10	1.5	601.6
12	604.0	8.5	ND	-
13	606.0	8	ND	-
14	603.0	15	7.5	595.5
15	603.4	15	5.0	598.4
16	603.6	15	ND	-
17	603.0	15	ND	-
18	602.0	8	ND	-
19	602.0	8	ND	-
20	601.9	8	1.4	600.5
21	601.0	8	ND	-
22	603.5	8	7.5	595.7
23	602.0	8	ND	-
24	602.0	8	-	602.0



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G.M. PAINT MIX BUILDING SURVEY
BORING LOCATIONS
FIGURE II-C-1

The Woodbine Group is the only formation in the area which has been significantly used as a drinking water source in the past. Water use records, published in TDWR Report 269, indicate that public groundwater consumption in Tarrant County from the Woodbine formation declined from a peak of 90 acre-ft/year in 1964 to 14.3 acre-ft/year in 1976. The City of Arlington currently obtains water from a surface water supply. Wells in the Woodbine formation tend to yield moderate quantities of water averaging 50 gallons per minute. Water quality of the Woodbine formation is generally good with total dissolved solids generally less than 500, chlorides less than 150 and sulfates less than 100 mg/l.

The primary source of groundwater in the Woodbine formation is rainfall on the outcrop area which runs north and south from Cleburne through west Arlington to Denton, Texas. Movement of groundwater is typically to the east-southeast. Groundwater movement has been estimated to be 15 feet per year (TDWR Report 269, 1982).

2. Site Specific Hydrogeology

Locations of soil borings, completed during the site survey, are shown on Figure II-C-1. Top of boring elevation, depth of boring, depth to top of groundwater (static) and approximate groundwater elevations are shown on the drawing.

Review of the geotechnical report, prepared by SWL, on the soil borings indicates that the area is underlain by a 1 to 2 foot layer of fill on top of a 30 to 40 foot layer of tan and gray silty clay which is situated over the Eagle Ford Shale Formation. Figure II-C-2 graphically presents a profile of the west loading dock area.

Groundwater was encountered in two district areas during the survey. A layer of perched water was encountered in an area at the northwest corner of the Paint Mix Building. This perched layer was encountered at a depth between 602 feet MSL on the north end and 598 feet MSL on the south end. Examination of borings indicated that seepage began at a level of approximately 1 foot in depth in the area north of the Paint Mix Building which coincided with the depth of granular base left over from the old rail spur. Seepage into southern most borings is occurring at a depth of 3 to 4 feet.

The second layer of water encountered was situated on top of the Eagle Ford Shale Formation at an elevation of approximately 574 feet MSL. The lower and upper water layers encountered at the site are separated by a 30 foot layer of silty clay. Review of geotechnical boring logs indicates that the clay contains intermittent vertical limestone and siltstone seams extending as deep as 10 feet. However, even though these seams are porous, the stability and presence of perched water observed and the presence of 30 feet of clay suggests that the clay layer serves as an aquaclude or barrier to vertical migration of perched groundwater.

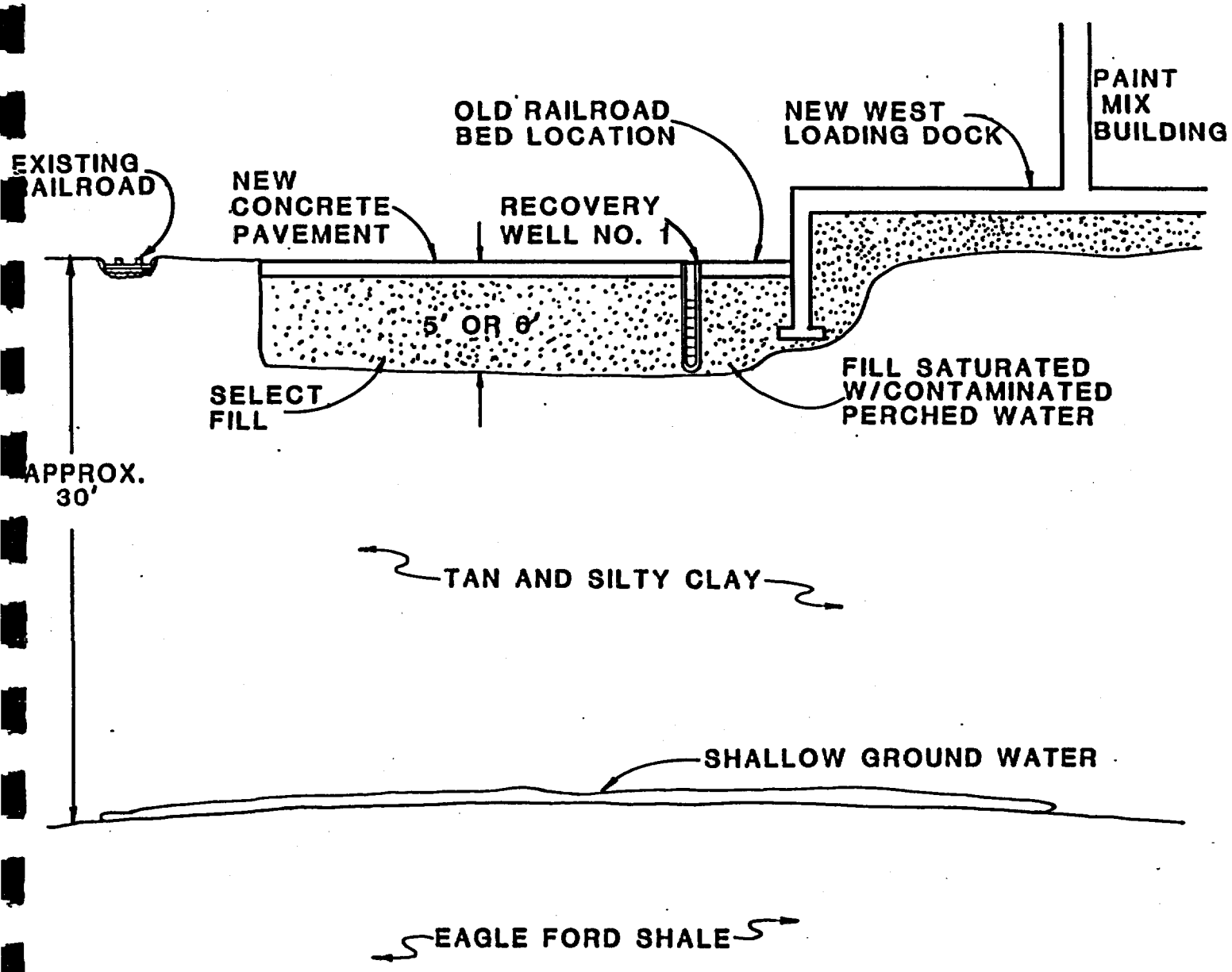


FIGURE II-C-2
PAINT MIX WEST DOCK
GEOLOGICAL PROFILE
NO SCALE

Water in the perched layer appears to be derived primarily from rainfall runoff entering the existing rail bed and spreading under the pavement along the old rail bed to the south towards the Paint Mix Dock. Perched water movement does not appear to occur under normal circumstances unless an excavation is made which allows the water to flow. Under normal conditions, the ground is saturated with water, especially around the existing and old rail bed.

Three (3) four-inch observation/recovery wells were constructed on March 2nd and 3rd, 1987. Eight (8) initial 7-1/2 inch diameter borings were completed at various locations in an attempt to locate the most productive contaminated perched layer well. Each boring was monitored with an organic vapor detector and water samples were collected from each wet hole. Borings RW-1, 2, 4 and 6 were dry holes and were not sampled. Borings RW-3, 5, 7 and 8 were wet and groundwater samples were obtained for volatile organic analysis (Refer to Figure II-C-1).

Three (3) four-inch PVC wells were constructed in borings RW-3, RW-7 and RW-8. Locations for well placement were decided based upon yield (flow rate) and organic vapor levels. RW-3 and RW-5 indicated high volatile organic levels while indicating low yields. RW-7 and RW-8 indicated high yields while indicating low organic levels. Yield tests were conducted by pumping the liquid level down, timing the recovery and measuring the water volume. Data from the tests for RW-3 and RW-5 indicated an average of approximately 0.1 gpm recovery rate for RW-3 and 0.05 gpm for RW-5 prior to well placement and development. RW-3 was selected for well placement based on the higher yield. RW-7 and RW-8 were also selected for well placement based upon location and high yield.

Construction of the wells was completed on March 3, 1987. Wells were numbered based upon location with Well No. 1 located in Boring RW-3, Well No. 2 in Boring RW-8 and Well No. 3 in Boring RW-7. The wells were developed to a depth of 6 feet with casing which was screened in the lower 4 feet and gravel packed the entire depth.

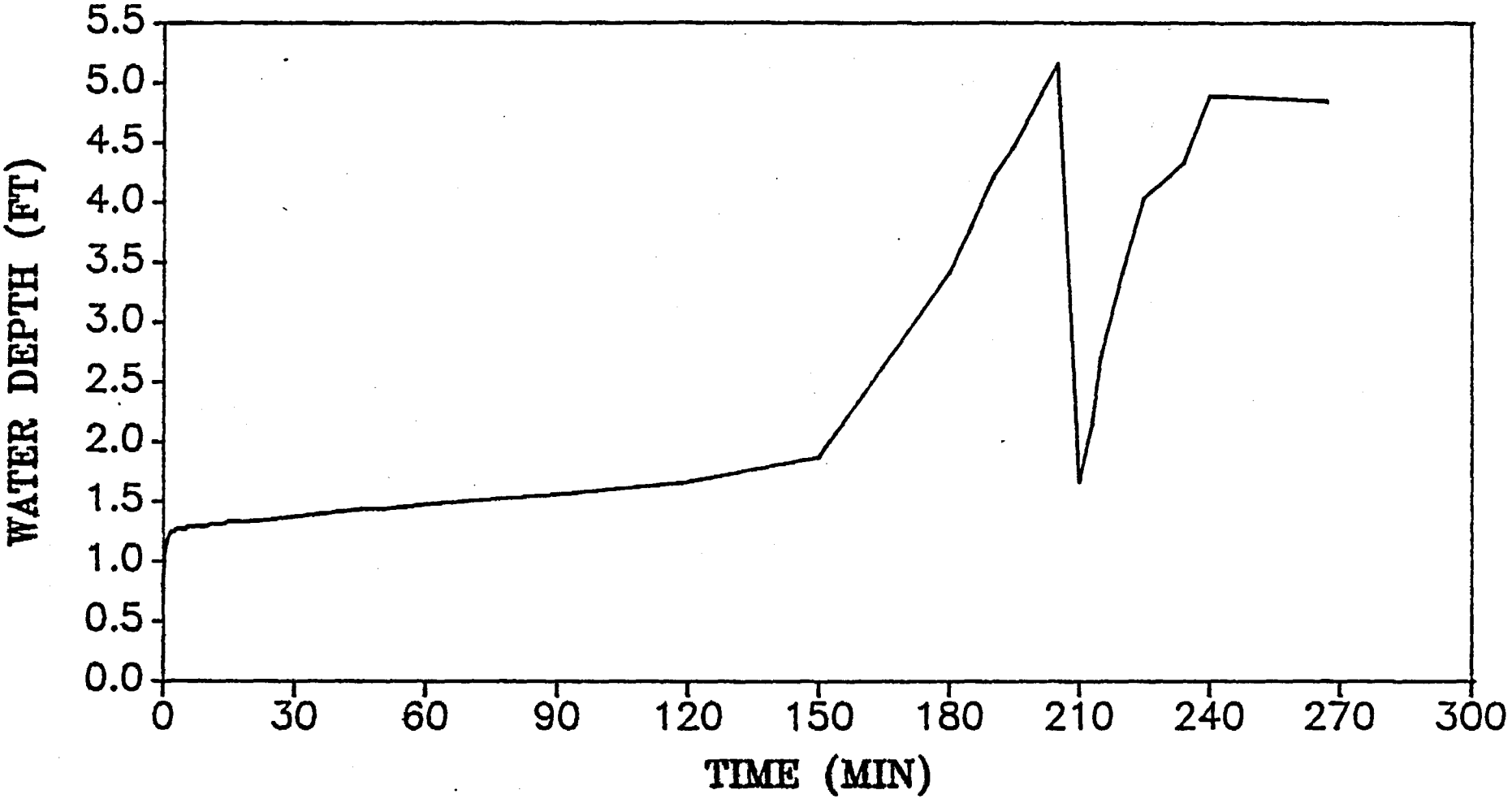
Pump tests were conducted in Wells No. 1 and 2 based upon the proximity of the wells to the Paint Mix Building. Well No. 3 was placed to serve as a monitoring well, if required. Pump tests were conducted on March 5th and 6th and indicated an average flow of 0.3 gpm at a depth of 2.8 ft from Well No. 1 and 1.3 gpm at a depth of 5.0 ft from Well No. 2.

Maximum drawdown of Wells No. 1 and 3 during Well No. 2 pump testing was 1/2 and 3 inches respectively. Results of Well No. 2 pump test indicate that a "pool" of water exists within the top 2 feet of the ground surface which yields higher flows without drawdown until the layer is exhausted. Figure II-C-3 presents results of a pump test conducted on March 5, 1987, which exhibits this phenomenon.

Maximum drawdown in Wells No. 2 and 3 during Well No. 1 pump testing was 1/2 and 0 inches respectively. Well recovery rate was measured by pumping down, timing the recovery and measuring the

GM ARLINGTON PAINT MIX

WELL NO.2 PUMP TEST DATA
MARCH 5, 1987



PUMP LOST PRIME AT 205 MIN
CONSTANT PUMPING AT 1.75GPM THRU 225MIN
PUMP REDUCED TO 1.31GPM FROM 225-615MIN

FIGURE II-C-3

water volume removed. Results of recovery tests conducted on March 6, 1987 are presented in Figure II-C-4 and indicate an average recovery rate of 0.25 ft/min or 0.3 gpm (1.24 gal/L.F.) when the level is maintained below 2.8 feet.

D. CONSTRUCTION ACTIVITIES

As mentioned previously, construction of the new dock resulted from the construction of a thermal oxidizer in the area adjacent to the south dock of the Paint Mix Building. Construction of the thermal oxidizer was begun in early January and is expected to be completed by the end of the summer.

In order to have the Paint Mix Building in service during and after the thermal oxidizer construction, a new dock was designed to be placed on the west side of the building. Excavation was begun in late November, 1986 and construction of the dock was completed by the end of March in order to open the plant for business on March 2nd, 1987 after an extended shutdown period began at Christmas, 1986.

Construction of the new dock included a new access drive for truck traffic. The area paved is shown on Figure II-C-1 and is bounded on the north by the access road just north of Boring No. 8 and on the south by the access road adjacent to Boring No.'s 2 and 9. Since perched water was seeping into the excavation pit, a concrete dam was constructed immediately north of the excavation which allowed the construction to continue. All seepage water was drummed, stored, sampled and disposed of in accordance with RCRA regulations. Once the dock was completed, the concrete dam was removed along with the gravel base material and surrounding topsoil and replaced with select fill in preparation for concrete pavement placement. All excavated materials were stored on and covered with polyethylene sheeting to prevent spreading of any contaminants. Disposal of the material is pending return of sampling analyses. Concrete pavement placement was completed in late February.

E. SUBSURFACE CONTAMINATION

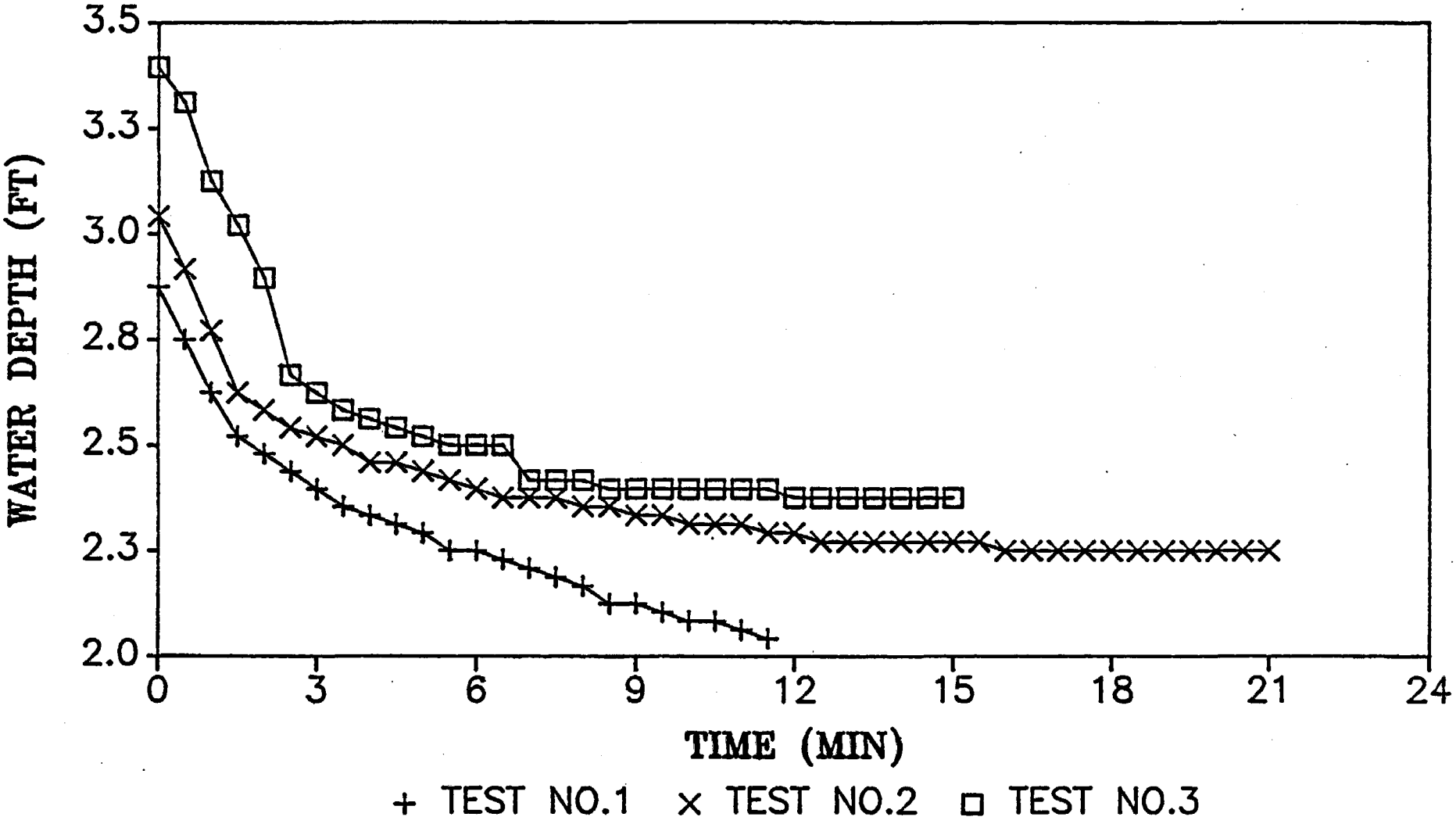
Samples were collected by HDR during several field surveys beginning on January 9, 1987. Additional samples were collected previously by GM and SWL personnel and the analytical data has been included.

Tables II-E-1 and II-E-2 present all inorganic and organic sampling data collected. Review of the analytical results indicates that the majority of the contamination is centered around the excavation pit. Highest concentrations of contaminants were obtained in soil samples taken from the abandoned railroad ballast granular base. Seepage water, which entered the excavation pit, originated from this granular fill seam which was exposed during excavation of the new dock foundation.

EP-Toxicity analyses were completed on samples which indicated the highest metal levels. Review of the EP-Toxicity results indicated that no metal contamination exists in the soil and water samples obtained at concentrations exceeding the EP-Toxicity limitations.

GM ARLINGTON PAINT MIX

WELL NO.1 PUMP TEST DATA
MARCH 6, 1987



WELL PUMPED DOWN TILL SUCTION BROKEN
PUMPED VOLUME RECORDED & LEVEL MONITORED
DURING RECHARGE

FIGURE II-C-4

TABLE II-E-1

GM ARLINGTON PAINT MIX SURVEY

INORGANIC ANALYTICAL RESULTS FROM NORC AND ALLIED LABS

Total Concentration (ppm)

Sample #	Antimony	Arsenic	Barium*	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	Cyanides
1-Water, 8'	-	0.03	-	-	<0.01	<0.05	-	<0.1	-	<0.05	-	-	-	0.29	-
1-Soil, 1'	-	0.16	-	-	0.31	7.36	-	9.0	-	31.4	-	-	-	120.0	-
1-Soil, 5'	-	0.08	-	-	0.26	5.79	-	9.0	-	46.9	-	-	-	57.20	-
1A-Soil, 1' (Total)	-	0.09	-	-	1.48	25.63	-	7.2	-	37.7	-	-	-	324.0	-
1A-Soil, 1' (EP-Tox)	-	-	1.30	-	<0.05	0.008	-	<0.05	-	-	-	-	-	-	-
1A-Soil, 4'	-	0.08	-	-	1.16	5.60	-	20.4	-	41.9	-	-	-	35.6	-
1A-Soil, 9'	-	0.04	-	-	1.14	7.46	-	20.4	-	41.7	-	-	-	42.1	-
2-Soil, 2' (Total)	30.0	0.11	-	0.1	0.29	19.8	4.18	248.0	0.005	25.0	<0.01	3.76	23.8	31.2	0.01
2-Soil, 2' (EP-Tox)	-	-	0.94	-	-	0.080	-	<0.05	-	-	-	-	-	-	-
2-Soil, 6'	-	0.11	-	-	0.27	5.6	-	10.1	-	28.9	-	-	-	34.8	-
2-Water, 29'	0.5	0.24	-	<0.1	<0.01	<0.05	0.18	0.20	<0.001	0.05	<0.01	<0.01	<0.05	0.36	<0.01
3-Soil, 2' (Total)	-	0.05	-	-	1.53	6.08	-	17.3	-	47.1	-	-	-	36.4	-
3-Soil, 2' (EP-Tox)	-	-	1.30	-	<0.05	<0.005	-	<0.05	-	-	-	-	-	-	-
3-Soil, 7.5'	-	0.09	-	-	0.92	6.28	-	12.8	-	38.1	-	-	-	39.6	-
3-Soil, 12.5'	-	0.08	-	-	1.36	4.33	-	14.0	-	41.3	-	-	-	37.6	-
3-Soil, 22.5'	-	0.13	-	-	0.62	6.08	-	14.6	-	35.1	-	-	-	46.8	-
3-Soil, 33.5'	-	0.14	-	-	0.64	3.29	-	10.7	-	25.3	-	-	-	42.8	-
3-Water, 33'	-	1.02	0.25	-	0.02	<0.05	-	0.6	-	1.13	-	-	-	1.17	-
6-Soil, 5'	-	0.05	-	-	1.08	2.84	-	10.5	-	48.2	-	-	-	49.6	-
8-Soil, 2'	-	0.14	-	-	0.94	3.28	-	12.2	-	26.8	-	-	-	55.6	-
9-Soil, 5'	-	0.07	-	-	0.29	3.12	-	11.3	-	46.4	-	-	-	39.2	-
11-Soil, 7'	0.05	-	-	-	-	2.33	-	10.4	-	82.8	-	0.35	0.05	-	-
13-Soil, 5'	-	0.11	-	-	0.18	2.95	-	7.2	-	34.4	-	-	-	30.0	-
13-Water, 2'	-	0.18	-	-	0.01	<0.05	-	9.3	-	0.73	-	-	-	3.5	-
14-Soil, 1'	-	0.09	-	-	0.86	6.06	-	13.4	-	37.3	-	-	-	18.7	-
14-Soil, 6'	-	0.05	-	-	0.82	6.08	-	10.8	-	45.6	-	-	-	33.3	-
16-Soil, 4.5'	10.0	11.73	-	<0.1	0.60	1.42	6.00	40.2	0.001	22.1	<0.01	1.33	2.67	26.8	<0.01
16-Soil, 8'	-	0.04	-	-	0.31	0.36	-	10.2	-	78.2	-	-	-	56.8	-
17-Soil, 5'	-	0.05	-	-	1.04	4.99	-	13.2	-	43.8	-	-	-	41.4	-
18-Soil, 8.3'	0.05	-	340	-	-	2.33	-	10.8	-	25.6	-	2.24	0.05	-	-
19-Soil, 7.8'	0.05	-	245	-	-	4.67	-	11.5	-	31.7	-	1.29	0.05	-	-
21-Soil, 8'	0.05	-	275	-	-	4.67	-	15.3	-	28.9	-	0.82	0.05	-	-
21-Water, 3'	-	0.01	1.0	-	-	-	-	0.1	-	0.05	-	-	0.01	-	-
22-Soil, 7'	0.05	-	215	-	-	1.66	-	8.80	-	40.8	-	0.59	0.05	-	-
23-Soil, 8'	0.05	-	225	-	-	1.33	-	9.32	-	36.1	-	0.47	0.05	-	-
24-Soil, 7.5'	0.05	-	290	-	-	6.00	-	8.92	-	49.4	-	0.71	0.05	-	-

All water samples collected with teflon bailer. Deep samples (2 and 3) collected thru center of hollow stem auger. All others collected thru open boring.
Soil samples obtained using shelby tube sampler.
Sampling and boring equipment deconned before and after each sample.
(-) "Dash" = Not Tested For

* Barium tests were performed incorrectly. Values shown represent samples which were subsequently rerun.

TABLE II-C-8

GM ARLINGTON PAINT MIX SURVEY

Analytical Results from Allied, SWL and NORC Labs
Concentration (ppm)

Date Sampled	Sample #	Toluene	Xylenes	Ethyl Benzene	MEK	MIBK	1,1,1 Tri-Chloroethane	Chloroform	IPA	Acetone	2-Hexanone	Benzidine	Benzo(ghi) Perylene	Fluorene	Dibromo-Chloromethane	5-Methyl-2 Hexanol	(1S,3S,6R)-(-)-3-Carene	Trichlor-ethene	Phenols
12/8/86	Pit Seepage Water Grab	344.00	383.00	-	6,054.00	-	-	-	7,812*	-	-	-	-	-	-	-	-	-	-
12/8/86	S-1,Soil 4"	1.00	1.00	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/8/86	S-1,Soil 16"	1.00	1.00	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/8/86	S-2,Soil 4"	6.00	14.00	-	14.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/8/86	S-2,Soil 16"	1.00	1.00	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/9/87	1-Soil, 1'	0.0438	.316	-	-	-	0.0767	-	-	-	-	-	-	-	-	-	-	-	-
1/9/87	1-Soil, 5'	0.383	.304	-	-	-	1.1100	-	-	-	-	-	-	-	-	-	-	-	-
1/9/87	1-Water, 8'	2.66	32.7	0.377	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	1A-Soil, 1'	2170	12,900	1800	15.30	-	0.0636	0.0266	-	-	-	-	-	-	-	-	-	-	-
1/10/87	1A-Soil, 4'	42.7	94.4	13.9	34.00	-	0.4750	0.0179	-	-	0.012	-	-	-	-	-	-	-	-
1/10/87	1A-Soil, 9'	20.6	36.2	5.33	1.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/9/87	2-Soil, 2'	76.9	9.06	1.554	-	-	0.0900	-	-	-	-	0.15	0.237	0.15	-	-	-	-	0.08
1/9/87	2-Soil, 6'	0.0544	0.307	-	0.0476	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	2-Water, 29'	0.0237	0.0281	-	-	-	-	0.0112	-	-	-	-	-	-	-	-	-	-	0.08
1/10/87	3-Soil, 2'	0.263	-	0.132	-	-	0.0409	0.0216	-	-	-	-	-	-	-	-	-	-	-
1/10/87	3-Soil, 7.5'	0.0921	0.0294	-	-	-	-	0.0283	-	-	-	-	-	-	-	-	-	-	-
1/10/87	3-Soil, 12.5'	0.0133	0.0167	0.0572	-	-	0.0083	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	3-Soil, 22.5'	-	-	-	-	-	-	-	0.070	-	-	-	-	-	-	-	-	-	-
1/10/87	3-Soil, 33.5'	-	0.0244	-	0.0096	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	3-Water, 33'	-	-	0.0472	-	-	-	0.0054	-	-	-	-	-	-	-	-	-	-	-
1/10/87	6-Soil, 5'	0.0055	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	8-Soil, 2'	15.5	86.2	4.76	0.6070	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/9/87	9-Soil, 5'	.249	4.50	.224	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/15/87	11-Soil, 7'	.0734	0.0722	0.0273	1.00	0.25	-	-	0.54	9.30	-	-	-	-	-	0.034	0.020	-	-
1/9/87	13-Soil, 5'	.0418	.0263	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/9/87	13-Water, 2'	0.00690	0.0381	-	-	-	-	0.0344	-	-	-	-	-	-	-	-	-	-	-
1/10/87	14-Soil, 1'	1.18	15.2	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	14-Soil, 6'	1.45	1.02	2.3	0.3540	0.142	-	-	0.040	0.250	-	-	-	-	-	-	-	-	-
1/10/87	16-Soil, 4.5'	121	-	18.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
1/10/87	16-Soil, 10'	0.0415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/10/87	17-Soil, 5'	12.0	62.0	21.6	1.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/15/87	18-Soil,7.5'-8.5'	0.006	-	0.005	-	-	-	-	0.250	0.063	-	-	-	-	-	-	-	-	-
1/15/87	19-Soil, 7'	0.006	-	0.222	0.013	-	-	-	0.026	0.031	-	-	-	-	-	-	-	-	-
1/15/87	21-Soil,6-10'	0.005	-	0.116	0.504	-	-	-	1.400	0.008	-	-	-	-	-	0.190	-	-	-
1/15/87	21-Water,6-10'	0.006	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/15/87	22-Soil,6-10'	0.005	-	1.340	0.512	-	-	-	1.500	0.038	-	-	-	-	-	-	-	-	-
1/15/87	23-Soil,6-10'	0.005	-	0.006	0.580	-	-	-	1.960	0.200	-	-	-	-	-	-	-	0.064	-
1/15/87	24-Soil,6-10'	0.006	-	0.006	-	-	-	-	0.200	0.082	-	-	-	-	-	-	-	-	-
1/27/87	Composite of drummed pit seepage water	0.60	0.48	0.250											-				
1/27/87	Pit water Grab sample	1.00	0.79	0.940											1.78				
3/3/87	Boring RW-3 Seepage Water, 3.9'	34.000	22.000	2.700	0.690	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/3/87	Boring RW-6 Seepage Water, 5.7'	31.000	22.000	4.000	0.574	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/3/87	Boring RW-7 Seepage Water, 1.0'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/3/87	Boring RW-8 Seepage Water, 1.0'	-	.0360	.0098	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/6/87	Well #1-Sample 1 Water, 2.3'	34.000	21.000	4.100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/6/87	Well #1-Sample 2 Water, 2.3'	27.000	19.000	2.600	0.337	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/5/87	Well #2, Water, 1.0'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: - All water samples collected with teflon bailer. Deep samples (2 and 3) collected thru center of hollow stem auger. All others collected thru open boring.

- Sampling and boring equipment deconned before and after each sample.
- Soil samples obtained using shelby tube sampler.
- Well No. 1 was constructed in Boring RW-3, Well No. 2 in Boring RW-8, Well No. 3 in Boring RW-7.
- Actual samples selected from extrusions based upon highest OVA (organic vapor analyzer) readings.
- MEK = Methyl Ehtyl Ketone (2-Butanone)
- MIBK = Methyl Isobutyl Ketone
- IPA = Isopropyl Alcohol
- (-) "Dash" = Not Detected

* - Result has been questioned and is being reevaluated.

Review of organic results indicates the major presence of paint thinner components and the minor presence of some additional organic compounds. Highest concentrations of organics were found in the granular fill between 1 and 5 feet in depth. Organic levels in samples below 5 feet in depth indicate that little of the organics has seeped down. As indicated previously, the area is underlain by a 25-30 foot layer of shaley clay situated over a layer of the Eagle Ford Shale. Groundwater was detected on top of the Eagle Ford Shale at approximately 30 feet in depth. Review of the analytical results for the groundwater samples taken at this depth (Samples 2 and 3) indicates that virtually no contamination has occurred, especially when the sampling methodology is taken into consideration (i.e., sampled through a hollow stem auger rather than a fully developed monitoring well).

Three (3) four-inch PVC groundwater monitoring/recovery wells were installed at the site on March 3rd and 4th, 1987. Volatile organic analysis of samples collected during the installation and pump testing of the wells indicate that the organic contamination is still centered around the western edge of the Paint Mix Building. Trace amounts (less than 50 ppb) of organics were detected in the initial seepage water in Boring RW-8 (Well No. 2) but were not subsequently detected in samples collected after a 4 hour pumping test.

Evaluation of the analytical and hydrogeological data was conducted to obtain an estimate of the volume of contaminated groundwater. An estimate of the minimum volume of water involved can be made assuming that the perched water is contained outside of the Paint Mix Building foundation, bounded by the access road to the north, loading dock to the south and by the extent of pavement to the west. The total area involved would be approximately 1600 ft^2 and could contain approximately 2,500 gallons of contaminated liquid assuming a water layer thickness of 2 feet and a water/soil capacity of 10%. A more conservative estimate can be made assuming that the perched layer averages 3 feet in thickness and underlies an area including the building and 50 feet of area on all sides. Under these assumptions, a total volume of 100,000 gallons could be contained. Should a large cavity be discovered under the building, the volume could be greater. Assuming an average of 50 ppm of VOC's, total VOC's in the groundwater could range from 1 lb. to 40 lbs.

Given that a plentiful supply of perched groundwater is available during rainfall events, the total volume of contaminated wastewater will depend upon the leachability of the organics from the soil. Concentrations of perched organic contaminants have steadily decreased with time and could be related to their high volatility and an increased change of dilution with time.

Given that a groundwater recovery system may extract 0.3 to 1.0 gpm maximum (assuming multiple wells) from the perched water layer with average VOC levels of 50 mg/l (total), the total VOC load to be treated would be approximately 0.6 lbs/day, maximum.

F. SOURCES OF CONTAMINATION

No underground tanks nor underground paint thinner lines exist at the Paint

Mix Building. Until the most recent spill, a building drain existed which collected floor washings and drained them to the wastewater treatment system. It is possible that this line could have collected paint thinner from floor spills and leaked through loose joints. All floor drains have been subsequently plugged and washings will have to be mopped or vacuumed up in the future.

The primary source of the current contamination problem appears to be a result of the spill which occurred just after the dock foundation excavation was completed. The liquid spill collected in the excavation and flowed through the old rail spur gravel seam into the perched layer. Impermeable soils and possible void areas serve to contain a majority of the organic contamination and slowly has been releasing the contaminants into the perched water.

Tests, conducted on the bulk paint thinner, indicate the following composition:

Methyl Ethyl Ketone (MEK)	60% (weight)
Toluene	14%
Xylene	20%
Ethyl Benzene	6%

Review of the above constituents reveals that the composition of the thinner is essentially identical to the major components in the contaminated groundwater. The major difference, however, is in concentration and relative distribution. For example, although MEK is a major component of the thinner, only small quantities of MEK have been found in soil and groundwater samples except for the initial seepage test which GM ran immediately after the spill cleanup. These low MEK results could be a result of the high volatibility and solubility of MEK. All of the remaining compounds are relatively insoluble in water and may tend to adhere to soil more readily. All compounds are lighter than water and will float.

G. PATHWAYS OF MIGRATION

A survey of existing facilities around the Paint Mix Building was conducted to determine potential sources of contamination and to identify potential pathways of migration. Potential pathway areas identified include:

- Drain and waste pipeline gravel bedding
- Railroad spur gravel bedding
- Building foundations

1. Drain and Waste Pipe Bedding

Two pipelines are situated in the zone of contaminated perched water. A 12-inch VCP industrial waste (IW) pipeline in a S-N direction runs approximately 15 feet to the west of the Paint Mix Building west ramp. The IW pipeline continues to the north approximately 130 feet at a depth of approximately 2-3 feet below ground level (EL 599) and empties into a grit separator and pump station which transfers the wastewater to the industrial wastewater treatment plant.

Although samples have been obtained near the IW pipeline, no specific samples of the pipe bedding have been collected.

The second pipeline in the contaminated zone is the aforementioned Paint Mix Building drain line. The drain line has been plugged and left in place. The line runs from the location of Boring No. 18 due west to the IW line at an elevation of approximately 599 above MSL.

Soil samples collected from Boring No. 18 did not indicate the presence of any major spill from the piping at the upper end. Samples have not been collected at the lower end.

2. Railroad Spur Gravel Bedding

As mentioned previously, remanents of an old railroad spur bed were left in the ground after removal of the rail and ties. The gravel bed has been observed to be a highly saturated water area and the rail bed has been used previously to direct stormwater to the north. Thus, the rail bedding would appear to be a good pathway for contaminant travel. However, samples obtained in the rail bed (including the most recent samples) north of the Paint Mix Building have not shown any significant contamination.

Review of groundwater elevations measured recently indicate that perched water flow, if any, may be in a southerly direction and therefore would account for the non-contamination of the northern area. Since the old rail bed terminated at the Paint Mix Building, the old gravel bed is not expected to be a major pathway of contaminants. However, a monitoring well has been placed in the north gravel bed and will be used to check for movement.

3. Building Foundations

The Paint Mix Building foundation is a spread footing with a 3 to 4 feet thick grade beam around the perimeter of the building. The compacted subgrade for this foundation could serve to permit migration of contaminants around the building but would also contain the contaminants around the grade beam because of the dense clay layer under the plant.

Samples have been obtained around the perimeter of the Paint Mix Building but not directly adjacent to the grade beam. Additional sampling will be conducted, once a significant portion of the perched water has been removed, to detect possible contamination.

H. OBJECTIVES OF INTERIM REMEDIAL ACTION PLAN

The Texas Water Commission (TWC) requested in their February 10, 1987 letter, that GM prepare a remedial action plan. As indicated in the letter, a comprehensive remedial action plan was requested which addressed the following:

1. Characterization of the contamination
2. Extent of contamination
3. Possible migration pathways
4. Effect, if any, on groundwater in the area
5. Proposed cleanup activities.

Due to the low EP-Toxicity inorganic results, remediation is proposed only for the removal of volatile organic compounds (VOC's). Since a contaminated perched layer of water exists under or around the Paint Mix Building, additional contamination or spreading of the contaminants is likely to occur. Until a significant majority of the mobile VOC's can be removed, remediation of existing contaminated soil cannot begin. Therefore, the primary objective of this interim remedial action plan is to implement a perched water layer remediation plan to immediately begin to remove the threat of continued spread of the contaminants. Once the perched layer contamination has dropped to acceptable levels, then a second remedial action plan will be implemented to address any remaining contamination.

Until the contaminated perched layer is removed, a final determination of the extent of soil contamination cannot be made since the VOC levels could be increased by the mobility of the contaminant. Once accurate soil VOC data is obtained, a second phase remedial action plan will be developed to address the remaining contaminants.

As indicated previously, potential pathways of migration, which have not been fully evaluated, include the industrial waste pipeline bedding material, building drain line bedding material and building foundation. Additional testing will be conducted during the interim remedial action phase to determine the extent, if any, of migration. Results of these investigations will be submitted to the TWC along with one of the Monthly Interim Plan Status Reports.

Remediation of the contaminated perched water layer is proposed to be completed using a french drain system located immediately north of the west loading dock to withdraw water at a rate of approximately 0.5 to 1.0 gpm. Total VOC load removed is anticipated to be less than 1 lb. per day. Treatment of groundwater may be required for a minimum of one month to as long as six months depending upon the amount of soil VOC's which may leach with groundwater movement. Recharging of the perched water layer is expected to occur from stormwater runoff entering the railroad bed. However, should yields decrease before VOC contaminants have been eliminated, artificial recharging may be considered.

Perched water will be continuously removed until Phase II Remedial Action Plan has been completed. Treatment of groundwater will continue until groundwater VOC levels, as measured in the recovery well, are at or below the recommended maximum contaminant level (RMCL) proposed in the Safe Drinking Water Act (SDWA) Amendments of 1986. Groundwater treatment will continue for a period of one month to demonstrate compliance with the RMCL's. The following RMCL's will be used:

Constituent	Proposed RMCL (mg/l)
Ethylbenzene	0.68
Toluene	2.00

Xylene	0.44

Methyl ethyl ketone (MEK) has been exempted by the SDWA Amendments. Since MEK is less toxic than all of the above contaminants, a limit of 2.0 mg/l is proposed for MEK (ACGIH, 1985).

Contaminated groundwater will be treated in an air stripping system as discussed in the following sections. Effluent levels from the air stripper will be designed to be below the RMCL limits discussed above. Effluent from the air stripper will be sent to the industrial wastewater pretreatment system for treatment and disposal. Total VOC emissions expected from this system are anticipated to be less than 1 lb. per day.

Monitoring will be conducted on the recovery well (french drain sump) and on the discharge to the industrial wastewater pretreatment system. VOC samples will be collected on a weekly basis during the first two months, biweekly during the second two months and monthly thereafter. Samples will be collected using a teflon bailer after bailing the well a minimum of one well volume. Each sample will be subjected to a complete VOC scan. Results of all sampling will be summarized in a monthly report and submitted to the TWC for review.

Once groundwater contaminant levels have been lowered to acceptable levels, additional soil sampling will be conducted to identify soils in the area which may contain contaminants. Sampling results will be summarized and a remedial action plan submitted for approval to the TWC within 60 days of completion of the interim action plan.

III. SCREENING AND ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

A. General

Available technology for removal of VOC contaminants in water can be categorized in two general categories: those that destroy the VOC's in the water and those that simply remove them from the water. Based on flow rates and contamination levels, the general type of treatment to be utilized can be selected. As a rule, if flow rates are high (several hundred gpm) and VOC concentrations are low (less than 10 mg/l), the VOC removal processes are usually more economical and practical. Whereas, the VOC destruction processes are applicable when flow rates are low and VOC concentrations are high. Another alternative to removal and destruction is the containment of the contamination/pollution at the affected site.

A summary of remedial action techniques, associated with the three general categories described above, and which can be identified as applicable to control and/or remediation of contaminated groundwater, are presented in Table III-A-1.

In evaluating the appropriate remedial action technologies, emphasis was placed on those technologies capable of meeting the objectives and goals of the interim remedial action plan. As previously mentioned, the interim remedial goal is to remove and contain the majority of the mobile volatile organic compounds found at the contaminated site. Therefore, three technologies associated with the destruction and removal processes were

TABLE III-A-1

SUMMARY OF AVAILABLE REMEDIAL ACTION TECHNOLOGIES FOR CONTAMINATED GROUNDWATER

Technology	Functions	Applications/Restrictions
• Containment (Impermeable Barriers) - grout curtain - slurry wall - sheet piling	Upgradient from or around sites, diverts uncontaminated groundwater flow away from wastes. Downslope or around sites, contains/collects contaminated groundwater to limit extent of aquifer pollution or protect off-site wells.	All land disposal sites and surface impoundments with groundwater contamination; requires expensive preconstruction geotechnical evaluation, limited to bedrock depths of under 60 feet. Compatibility of wastes with grouts and, to a lesser extent, slurry walls has not been fully tested. Grouts not suitable to poorly permeable soils.
• (Hydrodynamic Control)	Contains or recovers the plume within the radius of influence of an extraction well. Creates a hydraulic barrier to groundwater flow. Allows water within the plume to be pumped, treated, and pumped back into the aquifer or discharged to a surface body.	Applicable to containment of plumes where the boundaries of contamination are well defined. Changes in plume volume and site characteristics result in costly and frequent monitoring.
• Groundwater Pumping	Plume containment and/or cleanup through pumping which effectively reverses or stops the advancement of the contaminant front. Combines containment with cleanup of affected portion of aquifer. May be combined with recharge	Applicable to sites underlain by permeable, coarse-grained deposits. No guarantee that the approach will intercept entire plume of contaminated water. Systems are flexible and can be readily adjusted to account for changes in the plume.

TABLE III-A-1 (Continued)

Technology	Functions	Applications/Restrictions
• Biological Treatment	Destroys certain groundwater contaminants through bacterial activity.	Applicable to treatment of contaminated groundwater containing higher levels of organics. May be susceptible to shock loads. Not well suited to low or intermittent flow applications.
• Physical Treatment (Air Stripping)	Transfer of volatile organics from the water to air through aeration, resulting in treated water with very low VOC concentrations.	Applicable to treatment of contaminated waters containing varying degrees of volatile organics. Capable of removing over 99% of volatile organics from contaminated groundwater.
(Activated Carbon)	Applicable to removal of high molecular weight organics, insoluble or nonionized organics. Limited in practice to wastes with less than 10,000 ppm organics.	Adsorption of groundwater contaminants which involves contacting groundwater with carbon, which selectively adsorbs hazardous materials by physical and/or chemical forces.
• Bioreclamation	Bacterial degradation/removal of petrochemical contaminants and other organics as groundwater is recycled between pump stations.	Not effective for groundwater contaminated by heavy metals, certain chlorinated organics, or other non-biodegradables; short-term treatment only; may be very costly.
• Chemical Treatment	Chemical agents commonly used to oxidize, or destroy, organic compounds include chlorine, chlorine dioxide, sodium hypochlorite, hydrogen peroxide, ozone and potassium permagnate. In some cases UV light exposure is utilized to catalyze the oxidation reaction between the VOC and hydrogen peroxide or ozone.	Most of the chemical agents do not have sufficient oxidizing power to totally destroy most of the important VOC's in a reasonable period of time.

TABLE III-A-1 (Continued)

Technology	Functions	Applications/Restrictions
• Thermal Oxidation	Virtually all organic compounds can be destroyed if sufficient heat is applied for a long enough period of time. This type of destruction is usually accomplished in an incinerator where both water and the end products of the VOC destruction end up being exhausted into the atmosphere as gas and vapor.	For typical applications, the cost of incinerating VOC contaminated water is prohibitive. Another alternative to incineration is wet air oxidation, however, this method can be highly corrosive and require equipment with exotic materials.

considered the most attractive. The technologies selected for further evaluation were a) biological treatment, b) air stripping, and c) carbon adsorption.

B. Description of Selected Remedial Action Technologies

1. Biological Treatment

It is well established that bacteria will destroy many organic compounds. This is the basis of most municipal and many industrial wastewater treatment plants.

For biological treatment to work effectively, there must be a sufficient supply of organic compounds in the water to support a population of bacteria. This generally restricts biological treatment to applications where the total organic concentration is greater than about 50 mg/l. Biological treatment of water with low concentrations of VOC's as the only organic content would be very difficult because of problems with process control, possible inhibitory effects, and problems with developing a suitable biological culture. Treatment of VOC's combined with other organic wastes, as in publicly owned treatment works, may be preferable.

Organic compounds vary widely in their biodegradability. Many VOC's are slowly biodegraded, yet substantial removals are reported in POTW's using biological treatment. Most of the removal probably occurs from stripping of the VOC's into the air and from adsorption on the surface of the biological cells, rather than from actual degradation.

Two methods of biological treatment that may be utilized in treatment of contaminated groundwaters are the activated sludge process and trickling filters.

The activated-sludge process has the capability of converting essentially all influent soluble organic matter to solids. The air activated sludge process has proven effective in the treatment of industrial wastewaters containing high concentrations of organics. Industrial wastewaters from refineries and coke plants, pharmaceutical operations, PVC manufacturing plants, and food processing wastes have been successfully treated with the activated sludge process. Activated sludge is a possible alternative for clean-up of contaminated groundwaters, especially if the contaminant concentrations are high.

Trickling filters are currently used in conjunction with other treatment methods to treat wastewaters from refineries, pharmaceuticals, pulp and paper mills, etc. Trickling filters are well suited to treatment of low flow waste streams and are usually used as roughing filters to reduce organic loads to a level suitable for activated sludge treatment. Because of the short hydraulic residence time on the filter material, biodegradation along the filter media is generally insufficient to act as the sole means of biological treatment. By placing a trickling filter in sequence with activated sludge treatment, the filters are used to

even out loading variations while the activated sludge achieves the high removal efficiencies needed.

2. Air Stripping Technology

VOC's get their name from their common tendency to vaporize into air. This tendency makes the air stripping process very attractive.

Air stripping relies on achieving an equilibrium between volatile organic compounds (VOC) in water and air. Air stripping is most economically performed in a device called a pack tower. Figure III-B-1 shows a conceptual flow diagram of a packed tower. VOC contaminated water is pumped to the top of the tower where it is distributed over a bed of irregularly shaped plastic pieces (packing) approximately one to three inches in diameter. Air is blown into the bottom of the tower. As the liquid trickles down, it is constantly in contact with the air rising up through the packing. The degree of effectiveness of a packed tower to strip a VOC is dependent on the strippability of the compound and design of the tower. The mathematical model describing VOC mass transfer from water to air is the packing height equals the number of transfer units times the height of the transfer unit, or:

$$Z = (NTU)\ (HTU)$$

where: Z = packing height
NTU = number of transfer units
HTU = height of a transfer unit

NTU and HTU factors are determined by Henry's Law Constants for each VOC, ambient pressure, liquid loading rate, air loading rate, temperature, diffusion coefficients, and media coefficients (K_{1a}).

Henry's Law Constants for each VOC describe each compound's equilibrium partial pressure concentration in air to that compound's concentration in the water. Typically, the higher the Henry's Law Constant, the more easily is the compound stripped. Table III-B-1 lists the Henry's Law Constants for many commonly encountered contaminants including the primary compounds of concern at the GM site.

Pilot scale testing has shown that compounds with Henry's Constants greater than 50 at 20°C are relatively easy to strip. Review of the Henry's Constants for the three primary VOC compounds of concern indicate that each compound will be relatively easy to strip (Henry's Constants greater than 50). Stripping of methyl ethyl ketone is more difficult (Henry's Constant = 0.5) than the other compounds. Pilot tesing has shown that substantial removals (85% or greater) of methyl ethyl ketone can be attained by preheating the groundwater to 160°-180°F prior to stripping.

As temperature increases, so does the Henry's Law Constant (also referred to as a partition constant). Therefore, a Henry's Law Constant is referred to at a specific temperature. Kavanaugh and

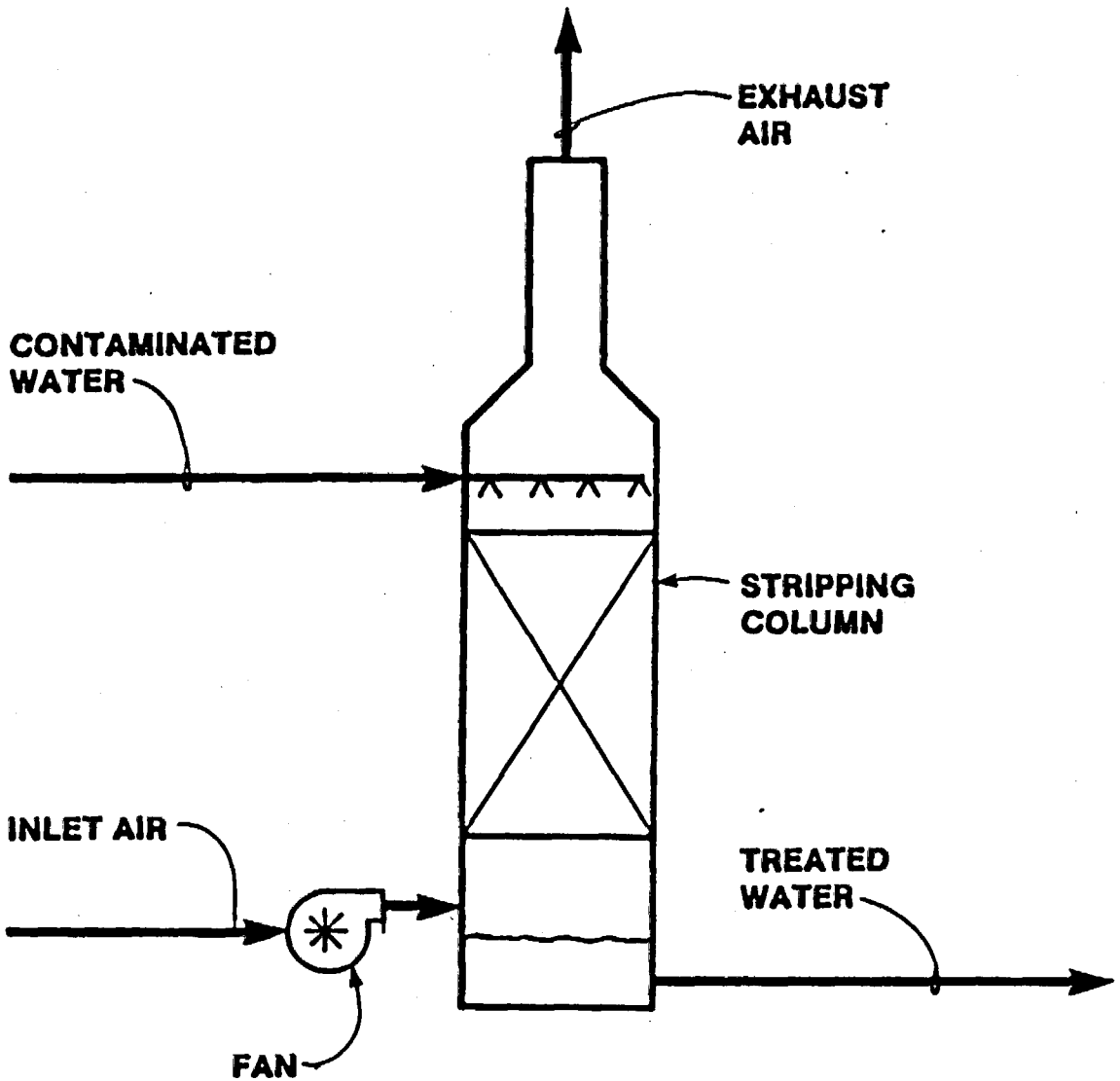


FIGURE III-B-1
CONCEPTUAL FLOW DIAGRAM
AIR STRIPPING

TABLE III-B-1
HENRY'S CONSTANTS FOR SELECTED COMPOUNDS
(20°C unless otherwise noted)

Compound	Formula	Henry's Constant (atm)	
Vinyl Chloride*	CH_2CHCl	3.55×10^5	
Oxygen	O_2	4.3×10^4	
Nitrogen	N_2	8.6×10^4	
Methane	CH_4	3.8×10^4	
Ozone	O_3	3.9×10^3	
Toxaphene*		3.5×10^3	
Carbon Dioxide	CO_2	1.51×10^3	
Carbon Tetrachloride*	CCl_4	1.29×10^3	
Tetrachlorethylene*	C_2Cl_4	1.1×10^3	
Trichlorethylene*	$CCHCl_3$	5.5×10^2	
Hydrogen Sulfide	H_2S	5.15×10^2	
Chloromethane*	CH_3Cl	4.8×10^2	1,1,1
Trichloroethane*	CCH_3Cl_3	4.0×10^2	Easy
Toluene*	$C_6H_5CH_3$	3.4×10^2 (25°C)	to
1,2,4 Trimethylbenzene*	$C_6H_3(CH_3)_3$	3.53×10^2 (25°C)	Strip
Ethylbenzene	C_8H_{10}	3.5×10^{2}**	
Xylene	C_8H_{10}	2.55×10^{2}**	
Benzene*	C_6H_6	2.4×10^2	
1,4 Dichlorobenzene*	$C_6H_4Cl_2$	1.9×10^2	
Chloroform	$CHCl_3$	1.7×10^2	
1,2 Dichloroethane*	CH_3CHCl_2	61	
1,1,2 Trichloroethane*	CCH_3Cl_3	43	
Sulfide Dioxide	SO_2	38	Difficult
Bromoform*	$CHBr_3$	35	to
Ammonia	NH_3	0.76	Strip
Methyl Ethyl Ketone	C_4OH_8	0.5	
Pentachlorophenol*	$C_6(OH)Cl_5$	0.12	
Dieldrin*		0.0094	

* Computed from water solubility data and partial pressure of pure liquid at specified temperature.
**Estimated from vapor pressure and solubility data

Trussel in a paper titled "Design of Aeration Towers to Strip Volatile Contaminants from Drinking Water" showed a typical partition constant - temperature relationship for various compounds, with known relationships shown as solid lines and projected relationships shown as dashed lines. These relationships are shown in Figure III-B-2 and illustrate the direct relationship of Henry's Constants and temperature.

Design models for countercurrent air stripping towers at low concentrations of VOC's have been extensively described in the literature. However, most systems design criteria are typically developed based upon pilot scale testing. Design parameters which have to be selected include:

- Height and diameter of tower
- Type of packing
- Packing depth
- Water and air flow rates

For a given percent removal, a multitude of choices exists between packing depth and air/water ratio, until a flooding condition is approached. Although most efficient operation occurs at 90-95% of flooding, this point is unstable, and minor fouling can cause flooding. The flooding limit at a high molar air/water ratio depends on a manufacturer's specific packing design, and may be in the 500:1 to 700:1 range. At the higher ratio, a shorter depth of packing may be used, but the air pressure drop, and associated energy blower costs, will rise. Generally, for small air stripper units, optimum hydraulic loading rates would be 15 gpm/ft^2 and optimum air/water ratio would be 150 to 200:1.

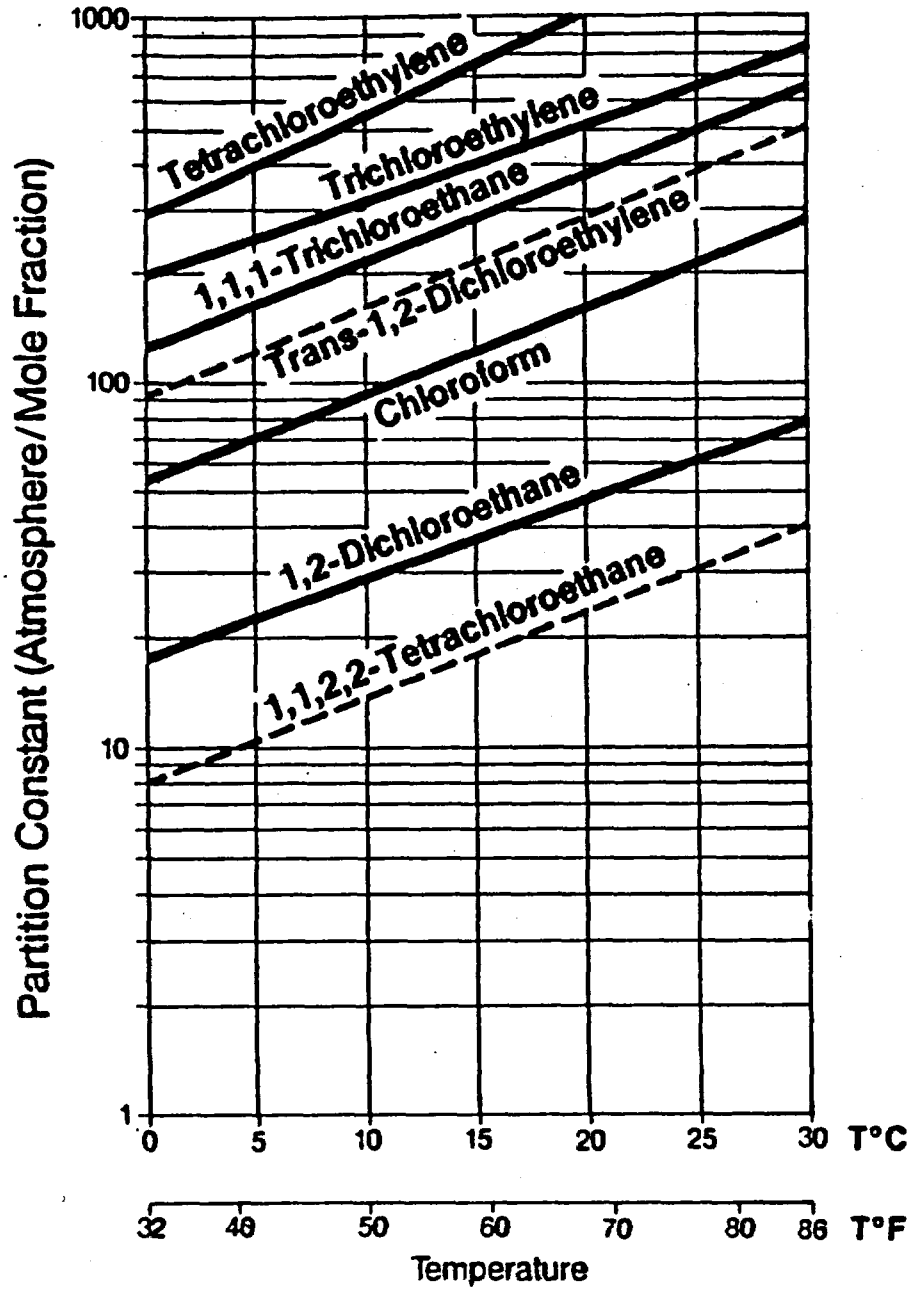


FIGURE III-B-2

PARTITION CONSTANTS FOR SELECTED COMPOUNDS VERSUS TEMPERATURE
(after Kavanaugh)

Volatile organic compounds can be stripped by mechanical systems other than countercurrent packed towers, although the latter is the most common technique. Other types include diffused aeration (where air is bubbled into contact basins), coke tray aerators (where water trickles down over many trays and the coke in the trays provides a large surface area and biological growth media), and cross flow towers (where air is pulled horizontally across the packing). Although some advantages for these other units exist, such as lower construction and operation cost and lower sensitivity to fouling, countercurrent towers are used due to their higher air to water ratio design limits, which is the design key to removal of trace volatile organic compounds from water.

Practical guidelines for countercurrent packed tower design includes not only a technically correct process design, but also good structural and operation and maintenance considerations. Waters may be encountered that have differing degrees of corrosivity, aggressiveness or desposition tendencies, iron or managanese which may cause fouling, or concentrations of solvents which may cause degradation of tower components. For example, one manufacturer's tray type aerator internals has a standard spacing of 6 inches, although treatment efficiencies can be enhanced by spacings of 2, 3, or 4 inches. However, they recommend not using tray type internals if iron concentrations exceed 0.5 mg/l. This number may be modified by evaluation of the aggressiveness of the water chemistry.

Various types of internal packings are available, including an expanded flattened aluminum mesh, redwoods slats supported by redwood spacers, PVC slats on stainless steel wire grids, triangular PVC slats, corrugated PVC in stacked or formed modules, and loose fill (usually polypropylene pall rings).

A typical subjective ranking of aerator internal components, listing relative efficiency, cost, and plugging tendencies is shown below, with the lower number representing higher efficiency, lower cost, and lower tendency for plugging.

TABLE III-B-2
RELATIVE RANKING OF AERATOR INTERNAL COMPONENTS

Type of Internals	Efficiency Ranking	Cost Ranking	Plugging Factor
Pall Rings	1	6	6
MC-47	2	5	5
Redwood Tays	3	2	3
Flat PVC Slats	4	3	2
Triangular PVC Slats	4	4	1
Aluminum Mesh	5	1	4

3. Carbon Adsorption Technology

Granular activated carbon and some synthetic resin materials have an ability to adsorb numerous volatile organic compounds according to a Freundlich equation of the form.

$$X/M = K\ C_f^{\ 1/n}$$

where: $X = C_o - C_f$, or amount of compound adsorbed for a given volume of solution
M = Mass of activated carbon
C_o = initial mass of contaminant in untreated solution
C_f = the mass of contaminant after contacting carbon in the treated solution

The data for adsorption characteristics of a given compound is usually fitted to a logarithmic form of the above equation as follows:

$$\log X/M = \log K + 1/n \log C_f$$

where K is the X/M intercept for the isotherm plot at $C_f = 1$, and 1/n is the slope of the line when the equation is plotted on logarithmic paper.

Design criteria for carbon contactors include surface loading (usually 2 to 7 gpm/ft^2), and a contact time between 10-60 minutes. Units are either configured in parallel or series configuration, with harder to remove contaminants (those with lower adsorption capacities) treated in series configuration.

Mechanisms behind the adsorption characteristics of organics on carbon include film diffusion, fluid phase port diffusion, internal surface diffusion, reaction with the solid surface, surface area, nature of the adsorbate, pH, temperature, interference from mixed solutes, and the nature of absorbant.

Pilot testing is often used to determine breakthrough, or the point where the mixture of organics has used up the adsorption capacity of the GAC. Unlike air stripping, where each contaminant's partial pressure allows stripping of that component relatively independently from other volatile chemicals, carbon adsorption sites are relatively fixed and each contaminant competes for adsorption with other compounds. Testing should include an evaluation of the fouling tendency for water in the beds from chemicals such as iron or manganese. Sequestering agents can be added to reduce those tendencies. A typical carbon bed used in emergency response or short term or long term water cleanups may consist of a unit 5 feet wide by 7 feet high by 16 feet long containing 5000 to 10,000 pounds carbon treating 90 to 250 gpm based on a 15 minute EBCT (empty bed contact time).

Granular activated carbon contactor units have also been used to remove airborne volatile compounds resulting from air stripping units. The air flow is often heated to enhance recovery by as much as 4 to 5 times

compared to an unheated air flow. Combinations of air stripping and liquid phase carbon adsorption technologies for sites have also been used cost effectively.

C. Screening of Applicable Technologies

Developing a remedial action plan involves careful consideration and evaluation of available technologies to develop alternatives. The purpose of this screening process is to evaluate the selected remedial action technologies on the basis of technical feasibility, performance, maintenance, service life and cost criteria and to select an alternative or combination of alternatives for preliminary design and implementation.

In this section, the selected remedial action technologies are evaluated with respect to site characteristics, and preliminary recommendations made for site clean-up. Although several technologies are available, many could be eliminated.

In comparing remedial technologies as they might apply to the General Motors site specific data, a subjective analysis was performed. Each technique was rated and ranked into a relative order on the basis of engineering feasibility, effectiveness, maintenance, service life and cost. In this step, certain remedial technologies were excluded because of infeasibility, while others were singled out as most appropriate. The level of detail developed to facilitate these evaluations is sufficient only to identify comparative or relative, not absolute, differences among alternatives. A subjective comparison of these remedial alternatives and how they can be applied to the General Motor's site has been summarized and presented in Table III-B-3.

TABLE III-B-3
COMPARISON OF REMEDIAL TECHNOLOGIES

Technology	Technical Feasibility	Performance	Maintenance	Service Life	Cost	Total
Biological Treatment	10	5	8	5	8	34
Air Stripping	2	1	4	4	3	14
Carbon Adsorption	4	5	5	4	4	22

Evaluation based on a numerical scale of 1 to 10, where a value of 1 is best and a value of 10 being unacceptable.

Biological Treatment

Biological treatment processes such as activated sludge and trickling filters require sufficient water and organics to support the biological community around which the processes are developed. Based on the limited flow rate of the withdrawal well(s) and the minor concentration of the organics in the water, this particular treatment process is considered technically unfeasible for the removal of the volatile organics from the groundwater pumped at the GM site. In addition, the cost to lease and operate a package treament plant would be expensive in comparison to the quantity of water treated.

Air Stripping

Pack tower aeration is considered Best Treatment Generally Available (BTGA) by the EPA for VOC's.

Packed Tower Aeration is considered BTGA because:

1. It can achieve high levels (99%) or more of VOC's removal under all anticipated conditions.

2. Its application is not limited by climatic conditions such as temperature or geographic conditions such as space.

3. It is compatible with other forms of water treatment.

4. It may be installed either at the well head or in a central treatment plant.

5. Technologies are available to handle any side effects (e.g., air pollution or increased corrosivity).

6. The equipment is commercially available and typical of that used by the water industry.

7. It can be designed for economical life.

8. It is reasonably affordable by large public water systems, and

9. It has been successfully applied to the removal of VOC's in full-scale plants in the U.S.

The air stripping process is not limited as much by flow rate as the biological treatment process. Most of the VOC's to be removed from the contaminated water at GM have comparatively high Henry Constants. Therefore, the volatility of these compounds is high and will have a natural tendency to migrate from water to the air. Because of this tendency to readily volatilize, use of aeration treatment systems, such as packed towers, are the most cost effective. In addition, packed towers are capable of attaining excellent removal efficiencies. Removal efficiencies up to 99% are not uncommon.

Carbon Adsorption

Although capital costs for carbon adsorption processes can be competitive with other forms of treatment with respect to removal efficiences, operating costs are usually high. Operating costs are directly related to the reactivation or replacement of spent carbon. Carbon filters have achieved excellent results in the past on the types of organic compounds found in the groundwater at the GM site. Removal efficiencies can be as high as 99%, which is similar to air stripping.

D. Recommended Remedial Alternative

Based on the criteria used to evaluate the remedial action alternatives (see Table III-B-3), air stripping (packed column) has been selected as the most applicable technology for the interim remediation at the General Motor's site. Groundwater pumping in conjunction with air stripping will accomplish the objectives of the interim remediation program which is to remove contaminated groundwater and treat the groundwater to very low VOC levels. Groundwater treatment will continue until the in-situ groundwater VOC levels are at or below the recommended maximum contaminant levels (RMCL's) proposed in the Safe Drinking Water Act (SDWA) Amendments of 1986. Without having pilot test data to determine mass transfer coefficients, etc. for the various VOC's that need to be removed, detail design calculations can not be made at this time. However, in discussions with various suppliers of packed tower equipment, it is safe to assume that one of the smaller standard size units will be able to achieve the remedial action objectives established in this report. A typical packed tower unit, which would be appropriate for this cleanup situation, would be 10-inches in diameter, 23 feet tall, with 15 feet of packing, such as 2-inch Jaeger tripack (polyproplyene) or equivalent, and designed to handle up to 8 gpm. The unit would have an orifice distributor tray, a demister mat, and a 1 to 2 horsepower (150 to 250 cfm) blower.

The proposed air stripping system would be sized to remove VOC's to below the proposed RMCL level. VOC emissions are anticipated to be approximately 1 lb/day or less.

Due to the small amount of water which can be removed on a daily basis (maximum of 1440 gallon/day) it is anticipated that the contaminated water could be either combined with makeup water and treated as it is pumped or accumulated in a storage vessel (holding tank) and batch treated when there is sufficient water to operate the tower. The advantage to having small quantities of water to treat is the water can be recycled through the air stripping device until adequate removals of the VOC's are attained.

IV GROUNDWATER TREATMENT SYSTEM DESIGN

A. General

Based upon discussions presented in Section III, air stripping is recommended as the groundwater VOC remediation technology. The groundwater treatment system is proposed to be located immediately north of the Paint Mix Building in an area adjacent to the site industrial waste pump station (refer to Figure IV-A-1).

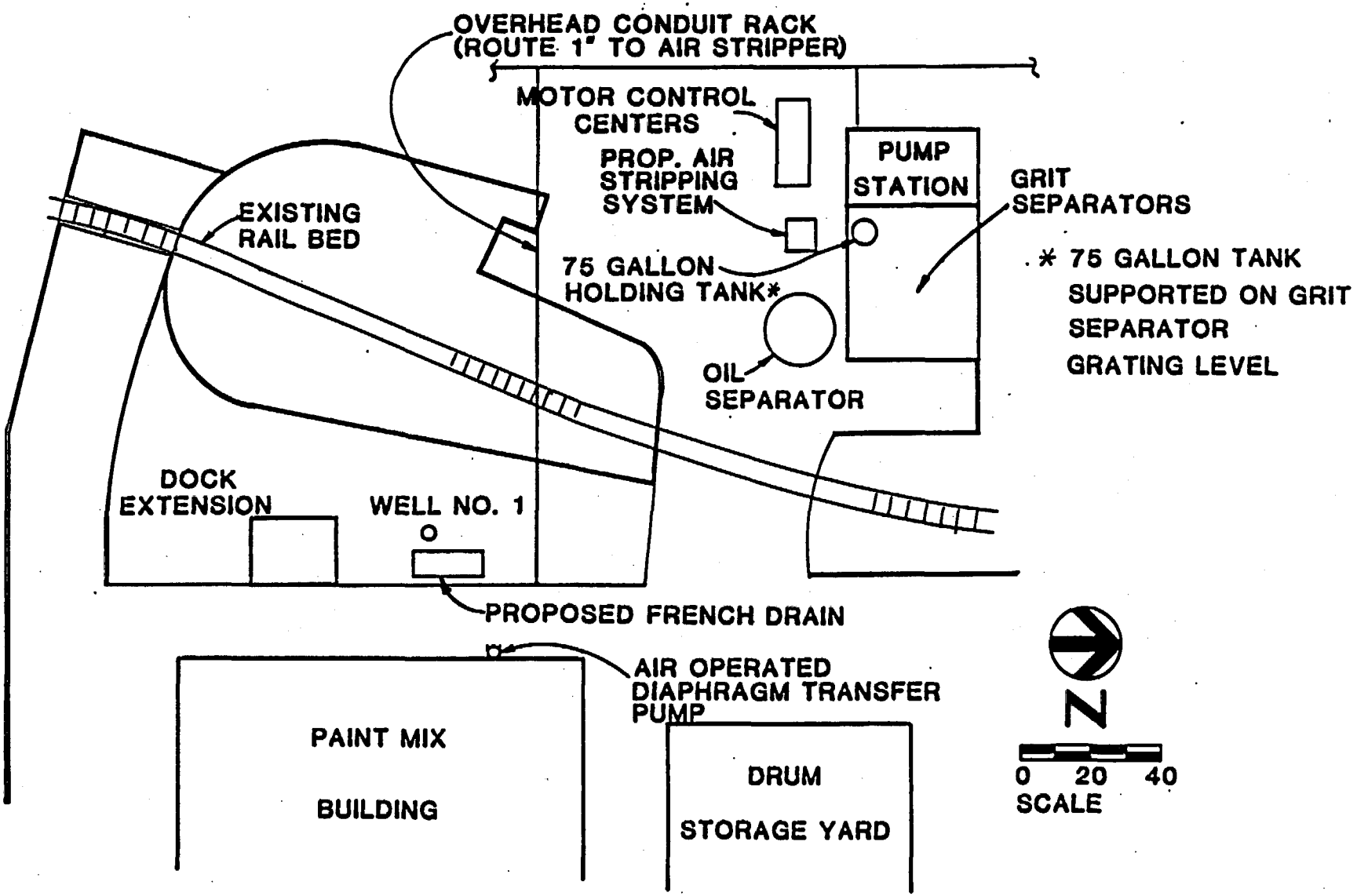


FIGURE IV-A-1
AIR STRIPPER SYSTEM LAYOUT

The groundwater recovery and treatment system will be composed of the following major items:

- French drain recovery system with centralized sump and sump pump.
- Air stripping column with 75 gallon holding tank and recirculation pump.
- Associated piping, valving, electrical and controls.

Discharge of the air stripping system will be routed to the site industrial wastewater pump station for transfer to the industrial pretreatment plant for additional treatment. Provisions will be made to allow for air stripper system effluent sampling.

B. System Design

A conceptual diagram of the proposed air stripping system is presented in Figure IV-B-1.

Collection of perched groundwater will be accomplished by constructing a 3 ft. W x 4 ft. D x 10 ft. L french drain in an area near Wall No. 1 (refer to Figure IV-A-1). Perched water will be pumped from a collection sump to the air stripper by a 1/2" air operated diaphragm pump through a 1 inch PVC transfer line which will be routed to the air stripper over an existing conduit rack.

Underflow from the air stripping column will gravity drain to a 75 gallon holding tank located on the grit separator grating level. A majority of the water will be returned to the air stripper by a sump pump. Return flow will be regulated by a valve and monitored by a rotameter. Excess flow will gravity drain to the site industrial pump station sump for transfer to the industrial wastewater pretreatment plant.

V SCHEDULING

A. General

As previously indicated in Section II-H, remediation of the Paint Mix VOC problem will be completed in two phases. Activities scheduled for the first phase are geared towards remediation of perched water layer VOC's. Second phase remediation activities will address all remaining VOC contaminants. A second phase remediation plan will be developed and submitted once the first phase has been completed.

B. Milestones

The following schedule presents an overview of key activities and milestones:

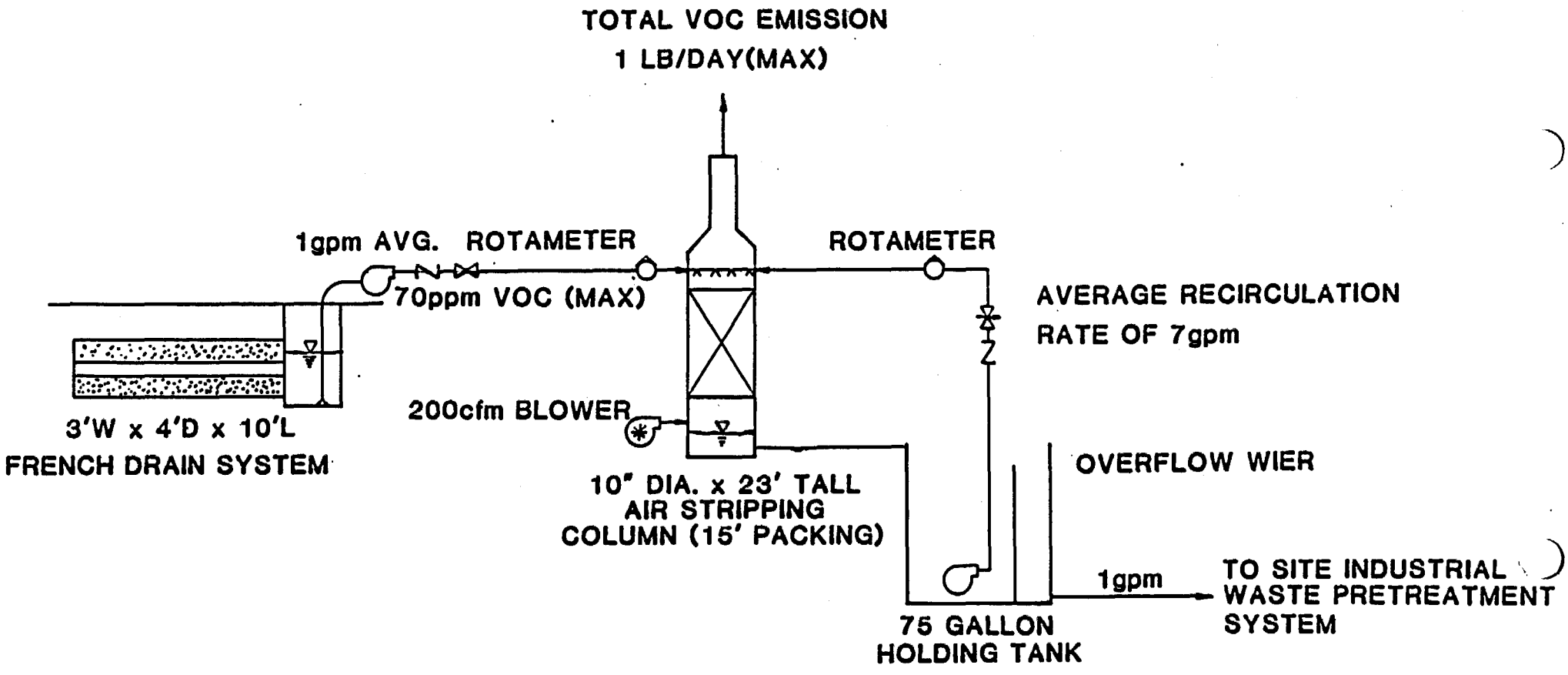


FIGURE IV-B-1
PROCESS FLOW DIAGRAM
VOC AIR STRIPPING SYSTEM

ITEMS	Scheduled Date
Receipt of Phase I TWC Approval	0 Days
Start-Up of Perched Water VOC Treatment System	30 Days
Submission of Performance Report No. 1	60 Days
Submission of Performance Report No. 2 (Addt'l reports due every 30 days through life of Phase I)	90 Days
Submission of Final Performance Report, Commencement of Phase II Sampling and Remediation Plan Development, Shut Down of Air Stripper Column (Perched water removal continues).	"N" Days (Depends on time required to achieve perched water goal).
Submission of Phase II Remedial Plan to TWC	"N" + 60 Days
Start-Up of Phase II Plan	(Depends on TWC Review and Approval Time)
Submission of Status Reports	Monthly
Submission of Final Report and Termination of Perched Water Pumping	(Depends on time required to achieve Phase II goal)

C. Interim Monitoring

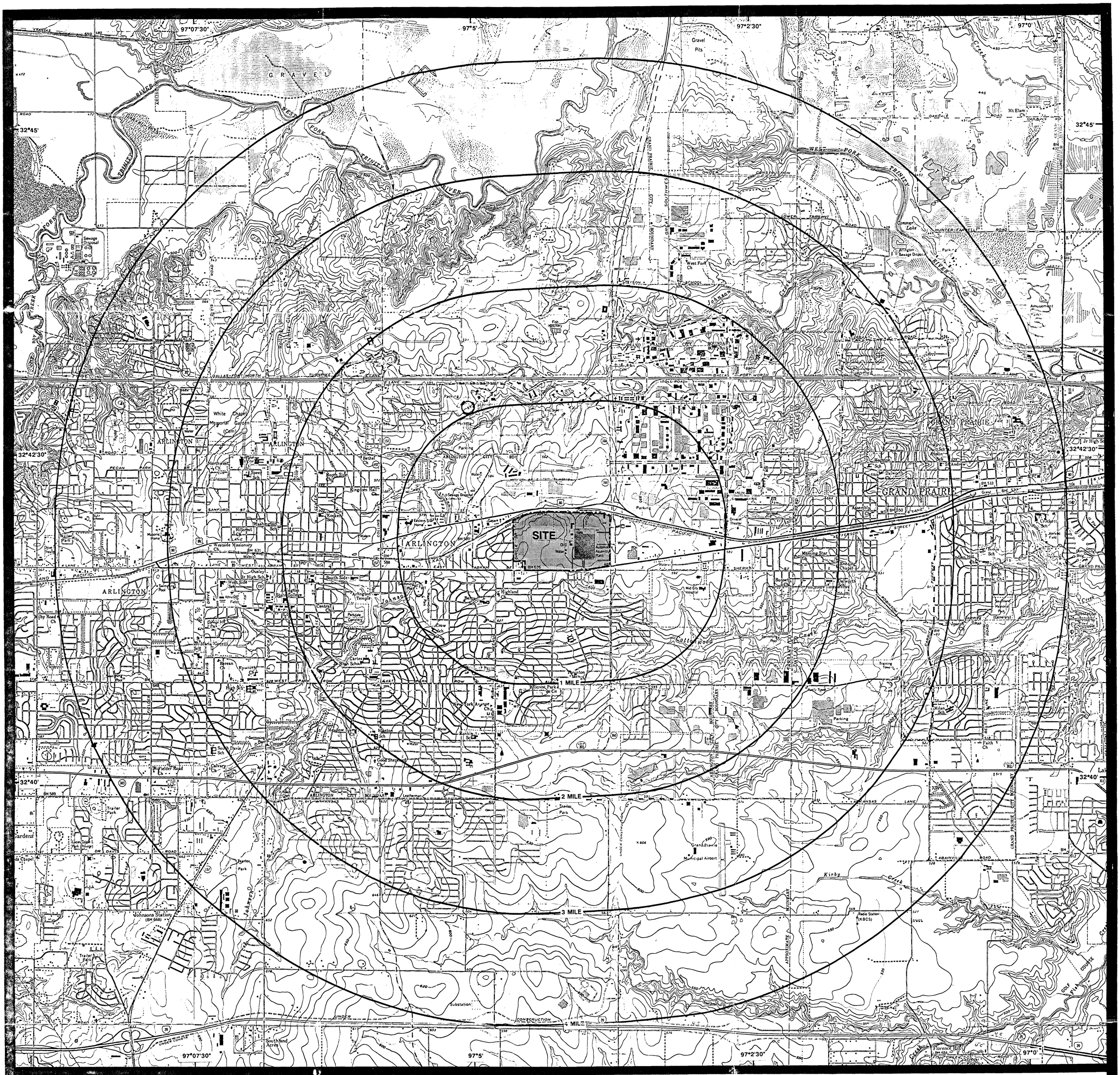
As discussed previously, interim monitoring will be conducted in the following manner:

1. VOA water samples will be collected from the perched water french drain sump and the air stripper effluent holding tank on a weekly basis for the first two months of operation. Each sample will be collected and analyzed for volatile organic compounds in accordance with EPA procedures.

2. VOA samples will be collected on a biweekly basis for the second two months and on a monthly basis thereafter.

3. An operations log will be kept which will record air stripper influent flow rate, perched water recovery flow rate, recirculation flow rate and water temperature on a daily basis.

4. Monthly status reports will be submitted to the TWC and will summarize operations data and analytical results.



REFERENCE: 6

LEGEND

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———

Medium-duty ——— Unimproved dirt .....

Interstate Route U. S. Route State Route

N

ecology and environment, inc.

USGS TOPOGRAPHIC MAPS

SITE NAME GM ASSEMBLY

LOCATION ARLINGTON, TEXAS

SITE ID TXD008018004

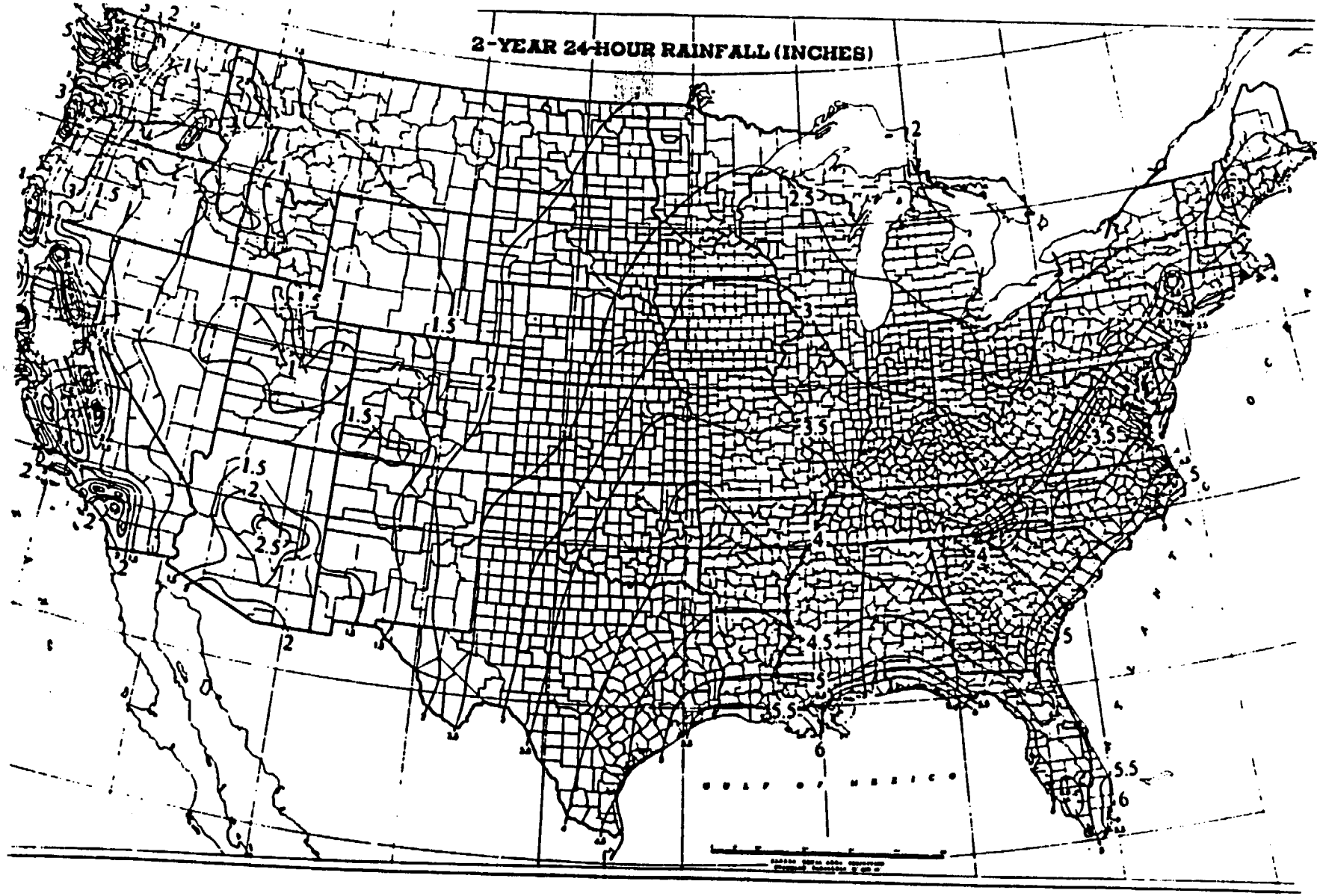
NAME HURST, TEXAS DATE 1959 REVISED 1981	NAME EULESS, TEXAS DATE 1959 REVISED 1968 & 1973	NAME IRVING, TEXAS DATE 1959 REVISED 1981	REFERENCE
NAME KENNEDALE, TEXAS DATE 1959 REVISED 1968 & 1973	NAME ARLINGTON, TEXAS DATE 1959 REVISED 1968 & 1973	NAME DUNCANVILLE, TEXAS DATE 1959 REVISED 1981	QUADRANGLE LOCATION

Scale 1:24000

1 1/2 0 1 mile

Ref. 7

Herschfield, D.M., 1961, Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.


2-YEAR 24-HOUR RAINFALL (INCHES)

Ref. 8

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

Ref. 9

TEXAS DEPARTMENT OF WATER RESOURCES

REPORT 269

OCCURRENCE, AVAILABILITY, AND CHEMICAL QUALITY OF GROUND WATER IN THE CRETACEOUS AQUIFERS OF NORTH-CENTRAL TEXAS

VOLUME 1

By

Phillip L. Nordstrom, Geologist

April 1982

shows the range of constituents and properties of water from representative wells in the Paluxy Formation.

Figure 20 shows the net sand thickness of fresh to slightly saline water-bearing sand in the Paluxy. Net sand thicknesses increase from less than 50 feet (15 m) in Johnson County to 190 feet (58 m) in Denton County. Ordinarily, the most favorable areas for development of ground water would be where the saturated sand is greatest. However, due to the heavy pumpage over the past 30 years, most areas are already overdeveloped and water levels are declining at an alarming rate. The only area that seems available for increased development would be in areas of Fannin and Lamar Counties. The six public supply wells in these counties are located in an area where water from the Woodbine is saline. Well yields in excess of 100 gal/min (6.3 l/s) with pumping levels below 300 feet (91 m) are encountered.

Any Paluxy wells developed in the area of the cone of depression in eastern Tarrant County can expect pumping levels, and in some areas static water levels, to be below the top of the aquifer. Pumps are usually set near the base of the formation. Outside this area and downdip from the outcrop, water levels are declining from 4 to 12 feet (1 to 4 m) per year. Correct spacing of wells is a prerequisite throughout the study region. Any additional development of the Paluxy will result in further lowering of the artesian head in areas where the water levels are still above the formation top. In sone areas, additional development will result in dewatering of the aquifer.

Woodbine Group

The Woodbine Group is an important aquifer in the study region. The outcrop extends in a south-north direction through the center of the report area and then trends to the east parallel to the Red River. The Woodbine dips eastward where it reaches a maximum thickness of about 700 feet (213 m) and has a maximum depth of 2,500 feet (762 m) below land surface. The areal extent of the outcrop and the approximate altitude to the top of the Woodbine are illustrated on Figure 21.

The primary source of ground water in the Woodbine is rainfall on the outcrop area. This area receives an annual rainfall of from 33 inches (84 cm) in the south to 37 inches (94 cm) in the north. Other sources of ground water include surface-water seepage from lakes and streams, such as Lake Grapevine, Garza-Little Elm Reservoir, and the Trinity River tributaries.

Water occurs in saturated sand beds under both water-table and artesian conditions. Water-table conditions occur in or near the outcrop while artesian conditions prevail downdip.

Recharge to the Woodbine occurs in the outcrop area, about 1,200 square miles (3,108 km^2), which consists of a permeable, sandy soil conductive to infiltration of rainfall and seepage from streams. The quantity of recharge to the Woodbine is estimated to be equivalent to less than one inch of precipitation per year on the sandy portion of the outcrop. The movement of water follows an east-southeast direction from the outcrop, generally paralleling the dip of the beds. According to Baker (1960), the average rate of water movement in the Woodbine is estimated to be about 15 feet per year (4.6 m/yr). The hydraulic gradient varies from over 30 feet per mile (5.7 m/km) to less than 13 feet per mile (2.5 m/km) within the study area except for minor local variations and for cones of depression around areas of excessive ground-water pumpage. The hydraulic gradient and a large cone of depression around the city of Sherman are illustrated on Figure 33, which also shows the approximate altitude of water levels in the Woodbine aquifer about 1976.

Discharge from the Woodbine occurs naturally through springs and seeps, evaporation, and transpiration by plants. Evapotranspiration is greatest in the summer and where vegetation is dense. Pumpage of wells constitutes most of the water artificially discharged from the aquifer and includes some flowing wells along the Red River portion of the outcrop. In 1976, about 20,500 acre-feet (25.3 hm^3) of ground water was pumped from the Woodbine in the region.

The coefficients of storage, permeability, and transmissibility and the specific capacity for the Woodbine are shown on Table 4. Aquifer test locations and results are shown on Figure 26. The table was compiled from existing literature and from tests conducted by water-well drillers. Data from aquifer tests were analyzed by using the modified Theis nonequilibrium formula in conjunction with a computer program which provides a means of computing transmissibility from the water-level recovery of a step-drawdown test. The permeability coefficients were computed by dividing the transmissibility by the effective sand thickness. Specific capacities of wells were determined by dividing the yield by the total water-level drawdown measured in the well.

The specific yield was estimated using seismic methods (Duffin and Elder, 1979) in the outcrop under

water-table conditions and is on the order of 15 percent. Downdip, where the aquifer is under artesian conditions, the average coefficient of storage is approximately 0.00015, or 1.5×10^{-4}. The coefficient of storage is dimensionless and indicates the volume of water that an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface.

Generally, the more permeable sands of the Woodbine occur on or near the outcrop, where permeability coefficients range from 84 to 167 gallons per day per square foot [(gal/d)/ft^2], or 3,400 to 6,800 liters per day per square meter [(l/d)/m^2]. Farther downdip, a range of 14 to 183 (gal/d)/ft^2, or 570 to 7,500 (l/d)/m^2, was encountered with an average coefficient of permeability of 44 (gal/d)/ft^2, or 1,800 (l/d)/m^2.

Transmissibility values are estimated to be considerably higher along the outcrop where water-table conditions exist. Two tests were conducted on irrigation wells completed in the outcrop in Grayson County and even though the tests were of short duration and thus not completely accurate, values of 7,870 and 16,700 gallons per day per foot [(gal/d)/ft], or 97,800 and 207,400 liters per day per meter [(l/d)/m], were obtained. The 24 remaining tests conducted mainly on public supply wells and utilizing data provided by the well driller showed a range of 1,320 to 14,700 (gal/d)/ft or 16,400 to 182,500 (l/d)/m and an average value of 4,700 (gal/d)/ft, or 58,400 (l/d)/m, can be expected. In 1945, the U.S. Geological Survey conducted five pumping tests (drawdown and recovery) on several Woodbine wells owned by the city of Sherman and obtained an average transmissibility of 2,400 (gal/d)/ft, or 29,800 (l/d)/m, and an average coefficient of permeability of 37 (gal/d)/ft^2, or 1,500 (l/d)/m^2.

Yields from 336 wells were measured and production ranged form 10 to 1,170 (gal/min) or 0.63 to 74 l/s. The average yield is 106 gal/min (6.7 l/s). Areas of largest production from the Woodbine aquifer are on the outcrop in Denton and Grayson Counties and downdip in Fannin, Grayson, Collin, Dallas, and Ellis Counties. Specific capacities were determined for 139 wells and ranged from 0.2 to 8.7 gallons per minute per foot [(gal/min)/ft], or 0.04 to 1.8 (l/s)/m, of drawdown with an overall average specific capacity of 2.9 (gal/min)/ft, or 0.60 (l/s)/m. The average yields and specific capacities by county are presented below:

County	Number of Wells Measured	Average Yield (gal/min)	Number of Wells Tested	Average Specific Capacity [(gal/min)/ft]
Collin	20	139	8	2.7
Cooke	8	124	2	1.6
Dallas	67	111	15	2.8
Denton	20	215	9	3.6
Ellis	24	177	11	2.2
Fannin	34	214	21	3.9
Grayson	108	223	53	3.2
Johnson	12	51	3	0.9
Tarrant	37	45	15	1.5

Water levels fluctuate seasonally as indicated by the periodic measurements in a number of observation wells completed in the Woodbine Group. Changes in water levels are illustrated by hydrographs. Water levels in the outcrop seem to recover to static level each year whereas wells in the downdip area reflect yearly declines. Long term water-level changes under water-table and artesian conditions are illustrated by Figures 7 and 10. The approximate altitude of water levels in Woodbine wells around 1955 is shown on Figure 34.

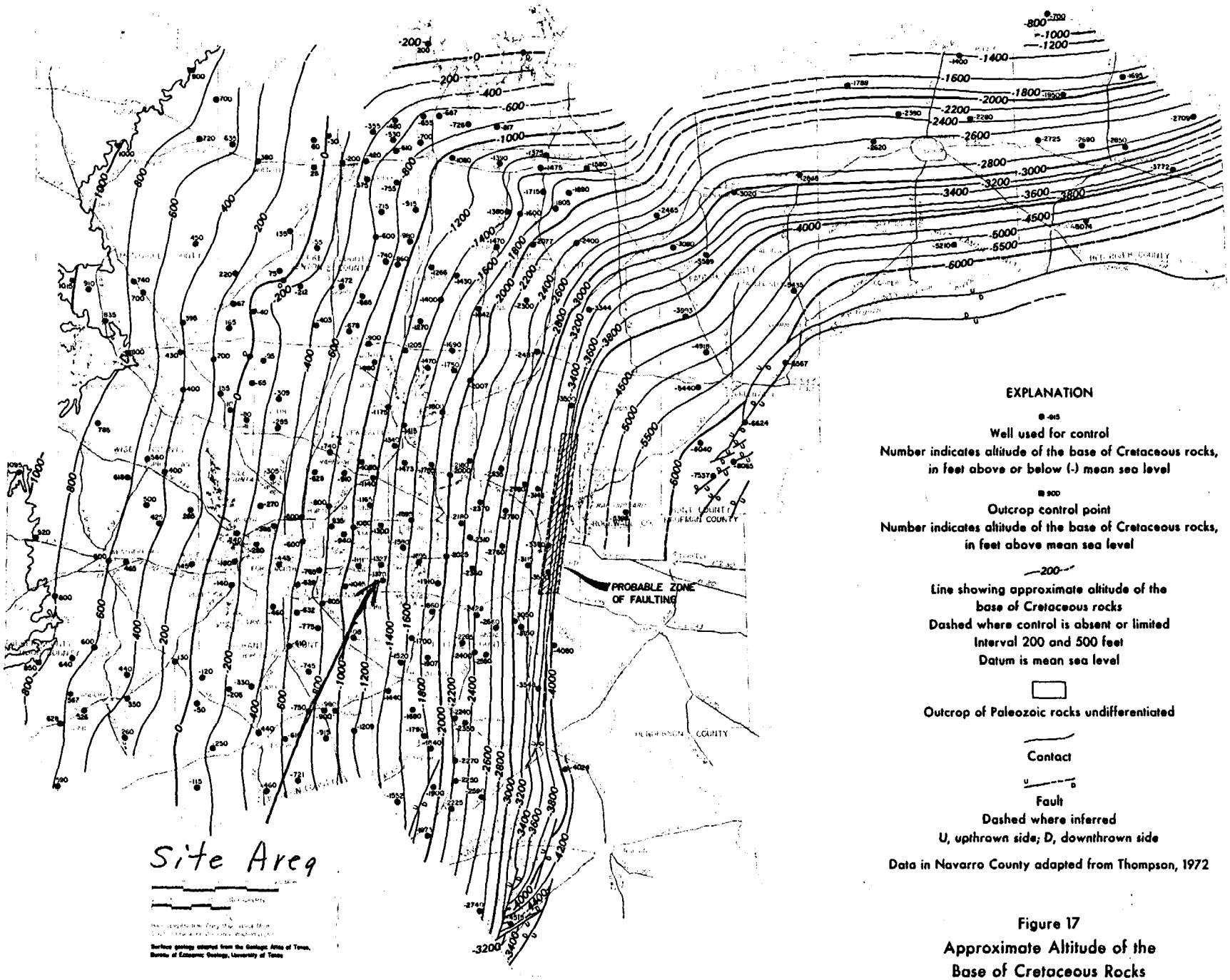


Figure 17
Approximate Altitude of the Base of Cretaceous Rocks

RECORD OF COMMUNICATION (214) 298-6171	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Tim Sewell Environmental Quality Specialist, Texas Water Commission, Duncanville, Texas	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/24/89 Time: 10:45 AM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

He inspected the site for the TWC up to about a year ago (Paul Cooper is in charge of it now).

There is no on-site residential population. The site has a security fence (and a separate security fence around the drum storage area) and security guards. It would be difficult for an off-site resident to gain access to the site.

Residential housing in the area is a mix of single family and multifamily.

He is not aware of any spills, or remedial action at facility other than:

1) Loading dock spill (tank inside building spilled; may have been previous spills from this area, but no documenation)

2) Underground tank spillage earlier this year

3) Closed lagoon

4) Drum storage areas (one closed, one active).

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref. 11 DE TS

CLOSURE CERTIFICATION REPORT

INDUSTRIAL WASTEWATER EQUALIZATION LAGOON

General Motors C-P-C
Arlington, Texas

January, 1986

HDR Environmental Technologies

Chevrolet-Pontiac-Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

January 10, 1986

Executive Director
Texas Water Commission
P.O. Box 13087
Capitol Station
Austin, Texas 78711

Re: Industrial Solid Waste Registration No. 30347
Closure Certification of Industrial Wastewater
Equalization Lagoon

Dear Sir:

To the best of our knowledge and belief, General Motors C-P-C has completed the lagoon closure in accordance with the referenced closure plan. The closure operation was conducted as detailed in Section B of the attached closure certification report.

Should you have any questions, please call.

Respectfully submitted,

Don Wise
Plant Engineering Manager
General Motors C-P-C Arlington

Thomas R. Caldwell, P.E.
Project Manager
HDR Environmental Technologies, Inc.

GENERAL MOTORS CORPORATION

C-P-C ARLINGTON

WASTEWATER EQUALIZATION LAGOON CLOSURE

A. CLOSURE PLAN

I. FACILITY INFORMATION

The General Motors Assembly Plant is located at 2525 E. Abram Street, Arlington, Texas 76010. The facility contact is Donald W. Tunstall, 817/649-6350. A plant plot plan is attached as Attachment A.

The Arlington Plant is engaged in the assembly of passenger automobiles and includes operations involving spot and fusion welding, metal coating, prime and color painting, and the mechanical fastening of various fabricated parts. The various manufacturing processes, which include zinc phosphating, paint spraying booths and stripping systems, acetylene generators, electroplated priming, boiler system blow down, and a deionized water production system generate wastewater that is treated prior to discharge to the Trinity River Authority waste treatment plant.

Wastewater from the zinc phosphating process is pretreated in an industrial wastewater pretreatment facility. Caustic is added to raise the pH and a flocculent polymer is used to promote solids settling in a clarifier. The solid sludge is sent off-site to an approved landfill for disposal. The treated phosphating wastewater is discharged to the trade waste sewer system, into the grit separators, and then into the industrial wastewater lagoon.

In addition to the treated phosphating wastewater, the various plant process wastewater discharges flow into the duplex grit separator via the trade waste sewer system. The grit separators are two 10,000 gallon open top tanks with drag bars and skimmers which allow settlement of most solids from the liquid waste stream. The drag bars and skimmers remove any floating and settled solids that accumulate in the separators. Approximately 60% of the trade waste has been previously "treated" for pH adjustment that induces settling of the solids.

The solid waste collected from the grit separators is sent off-site to an approved waste landfill for disposal. Liquid wastes are pumped into a two compartment, concrete industrial wastewater equalization lagoon. The first compartment allows additional settlement of solids not removed in the grit separator and overflows into a secondary settling compartment which provides even further solid settlement. The clarified overflow of the second compartment enters the sanitary sewer system by gravity.

I. FACILITY INFORMATION (Continued)

During normal plant operations, the sludge that accumulates in the concrete lagoon is removed once each year and sent off-site to an approved landfill for disposal. The sludge is a listed hazardous waste under the Resources Conservation and Recovery Act regulations of the U.S. Environmental Protection Agency and the Industrial Solid Waste Rules of the Texas Department of Water Resources. The EPA waste identification number is F006, sludges generated from the treatment of electroplating operations; the Texas number is 950110. A copy of the waste analysis of the sludge is attached. (See Attachment B.) The results of the analysis indicate that the sludge, even though it is a listed hazardous waste, does not exhibit any hazardous characteristics.

General Motors is in the process of constructing a new industrial wastewater pretreatment facility to replace existing facilities including the concrete lagoon. Therefore, the lagoon will be closed according to the requirements of Sections 335.213, .214, .215, .216, .233 and .286 of the Texas Industrial Waste Management Regulations.

The estimate of maximum waste inventory in the lagoon is the maximum capacity of the lagoon as shown below. However, it is estimated that at the time of closure the inventory will be 226,000 gallons of wastewater and 2,000 cubic yards of F006 sludge.

II. EXISTING FACILITY CONSTRUCTION

The original earthen wall lagoon was excavated in 1954. In 1965, it was lined on the sloped walls and bottom with reinforced concrete; and it was divided into two compartments by the addition of a concrete dam. The total capacity is 630,000 gallons (475,000 gallons-primary settling compartment, 155,000 gallons-secondary settling compartment). Drainage holes in the face of the dam wall allows liquid to flow from compartment one to compartment two. A sump at the outfall end of compartment two provides gravity feed of overflowing liquids to the sanitary sewer system. See Attachment C.

III. CLOSURE PLAN

A. Removal of Lagoon Materials

The wastewater in the lagoon will be removed by pumping it to the municipal sewer system, which currently receives the normal overflow on a continuous basis. Care will be taken to assure that the discharge does not exceed the City of Arlington pretreatment limits. The solids remaining in the impoundment will be removed and hauled off-site for disposal at a properly licensed facility. The volume of sludge is estimated to be approximately 2,000 cubic yards.

The sludge, concrete structure, and one foot of underlying soil will be removed by a contractor who is an authorized hazardous waste transporter and disposer. He will supply the labor, equipment and material necessary for the pumping and/or dredging of the lagoon and demolition of the lagoon structure. The contractor will provide subsequent transportation and disposal of the sludge and excavated debris which is collected. The total quantities of concrete and soil to be removed are estimated to be approximately 3,700 cubic feet and 11,000 cubic feet, respectively.

The contractor will comply with the applicable Federal, State and local laws and regulations for the handling, transportation and disposal of the materials.

The contractor will be prepared to contain any spills that might occur during these operations and will recover any spills, residuals, and clean-up materials from any spills which might occur. This material shall be recovered and placed in an appropriate containment.

Disposal of hazardous waste will be at a licensed hazardous waste disposal facility or facilities, where the materials will be disposed of in compliance with applicable Federal and State Regulations.

III. CLOSURE PLAN (Continued)

B. Underlying Soil Testing

After the excavation activities listed above have been completed, samples will be collected at fifteen locations and at four depths at each location under and surrounding the lagoon. Approximate locations of sampling locations are shown in Attachment D. Attachment E illustrates the depth at which samples will be collected at each location. In addition, soil samples will be collected at six locations around the lagoon area (see Attachment A) by grab sampling of the layer immediately below the topsoil or root zone. The six samples shall be composited in equal parts to form one background sample for analysis.

The uppermost samples of each set of lagoon subsoil samples will be analyzed for hazardous waste characteristics as outlined in Section 335.62(2) of the Texas Industrial Waste Management Regulations, 40 CFR Part 261, Subpart C, and for the following additional constituents: nickel, zinc; and pH. If any of these analyses indicate that the lagoon subsoil exhibits hazardous waste characteristics, or constituent levels that exceed ten times the average background levels, the next depth of sample from each set of samples will be analyzed for these same parameters. Analysis will be continued with the next depth until the remaining subsoil reaches the above levels.

Underlying Soil Removal

After the evaluation as described in IIIB above, a determination of the amount of additional subsoil to be removed, if any, will be made based on the analytical results. These results and the extent of soil removal will be kept on file for Agency inspection. The procedure to be followed in removing additional subsoil will be the same as that for removing the first foot of subsoil.

The amount of additional subsoil to be disposed can only be estimated when the soil analysis has been completed and will be determined based on the closure procedures for this facility.

III. CLOSURE PLAN (Continued)

D. Decontamination of the Structure and Equipment

The equipment, which may be power shovels and/or front end loaders, used during closure will be decontaminated by scraping and washing.

Solid material cleaned from the equipment is estimated to be less than 5 cubic yards and will be disposed of with the other hazardous waste in an approved landfill. Liquid resulting from cleaning of equipment will be disposed of in the industrial wastewater treatment plant. All cleaning of equipment will be performed on the adjacent waste storage pad area which drains to the new industrial waste treatment system.

E. Post Closure

If the lagoon is decontaminated according to the above procedures pursuant to Texas Administrative Code Sections 335.286(a) and (b) and 335.456(c)(1), and federal regulations 40 CFR 265.228(a) and (b), post closure care would not be required.

F. Area Restoration

Following removal of the subsoil, the entire excavated area will be backfilled with clean soil. The new soil grade will be sloped to prevent accumulation of water on the site, and the area will be seeded to prevent erosion. Erosion control measures will be practiced during the closure activities.

G. Contingency

If the lagoon cannot be successfully decontaminated by the above procedures, it will be capped and deed recorded as a landfill in accordance with Texas Administrative Code Sections 335.4 and 335.5 and applicable regulations or a delisting petition will be submitted to the TDWR for delisting of the remaining subsoil.

IV. IMPLEMENTATION SCHEDULE FOR CLOSURE

The schedule presented below will be followed in implementing the procedures outlined in Section III of this plan. The dates shown are predicated on completion and successful compliance demonstration of the new pretreatment facility by September 28, 1985.

CLOSURE SCHEDULE

Task	Begin Date	Complete Date
Receive approval of the Closure Plan from the TDWR		7-01-85
Drain wastewater from the lagoon	9-03-85	9-06-85
Remove sludge from the lagoon	9-09-85	9-27-85
Remove concrete and excavate 1 foot of subsoil	9-22-85	10-11-85
Decontaminate sludge removal equipment	10-12-85	10-13-85
Collect and analyze additional subsoil samples	10-07-85	10-23-85
If necessary, remove and dispose of additional subsoil from the excavated area	10-24-85	11-08-85[1]
If necessary, decontaminate subsoil removal equipment	11-09-85	11-10-85[1]
Backfill excavated area and slope area[2]	11-11-85	11-29-85
Closure certification	9-03-85	11-29-85

[1] May not be necessary

[2] Reseeding to be done in Spring, 1986

V. CLOSURE CERTIFICATION

To ensure that the closure of the facilities are completed as outlined in the closure plan, four (4) inspections of the operations by an Independent Registered Professional Engineer are anticipated.

The following qualifications, or certifications similar to these, will be completed following closure.

OWNER CERTIFICATION OF CLOSURE

I, _____,
(Owner or Operator)
of General Motors Assembly Plant, 2525 E. Abram Street, Arlington, Texas, hereby state and certify that, to the best of my knowledge and belief, the industrial wastewater equalization lagoon has been closed in accordance with the facility's closure plan, and that closure was completed on the _____ day of _____, 19__.

_____ _____
Signature Date

_____
Title

INDEPENDENT PROFESSIONAL ENGINEER CERTIFICATION OF CLOSURE

I, _____,
(Name)

a Registered Professional Engineer, hereby state and certify, to the best of my knowledge and belief, that I have verified that Professional Engineer Closure Certificates were issued for all prior closure activities at the General Motors Assembly Plant, Arlington, Texas; and that I have made visual inspection(s) of the aforementioned facility, and closure of the industrial wastewater equalization lagoon has been performed in accordance with the approved closure plan.

_____ _____
Signature Date

_____ _____
PE License Number For State of

_____
Business Address

_____
City/State/Zip Code

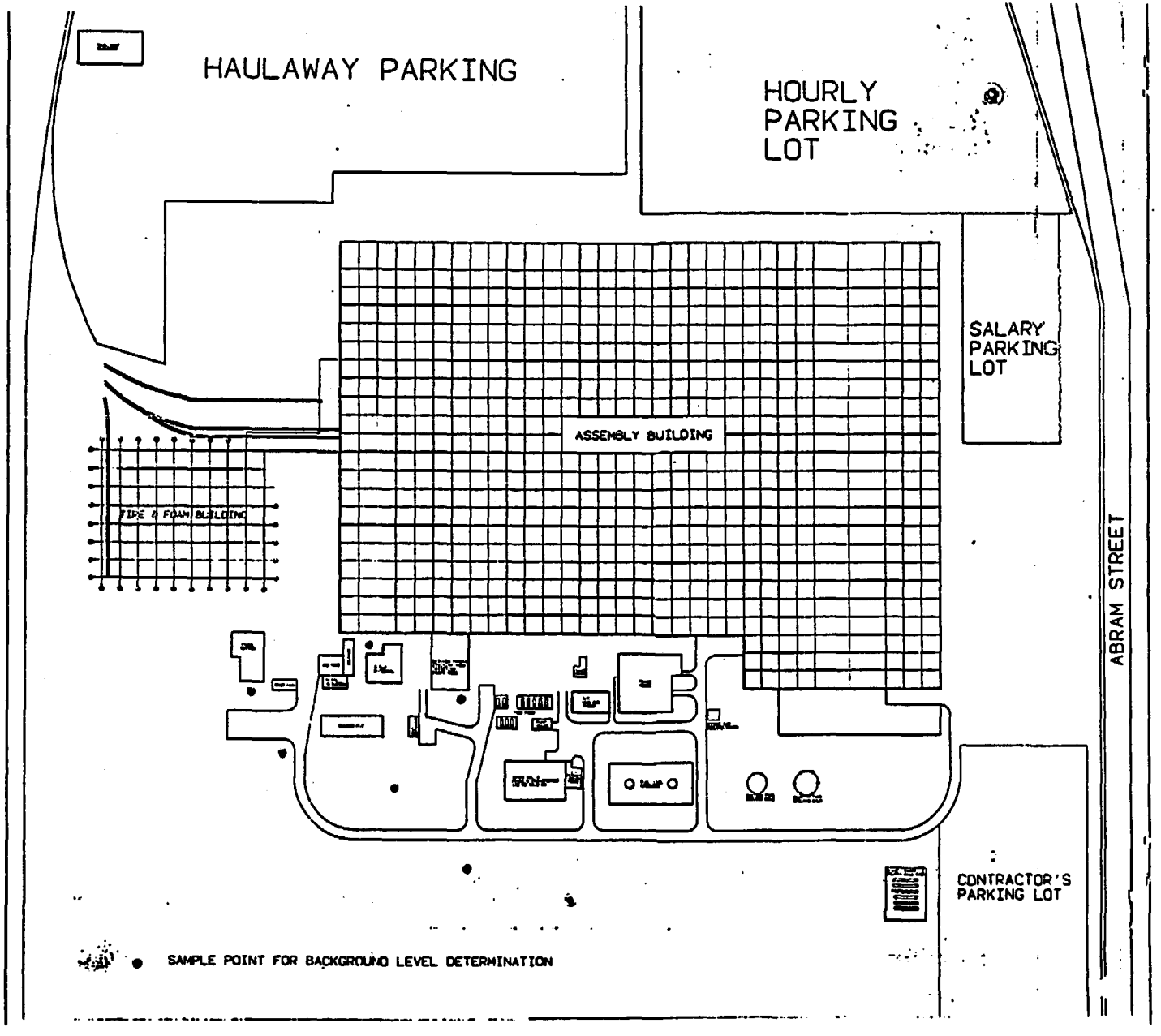
_____
Business Telephone (With Area Code)

VI. CLOSURE COST ESTIMATE

A.	Pumping of wastewater (226,000 gals. @ $.20/gal.)	$ 45,200
B.	Removal and disposal of sludge (2,000 cu. yds. @ $200/cu. yd.)	400,000
C.	Removal and disposal of concrete structure and one foot of subsoil (550 cu. yds. @ $250/cu. yd.)	137,500
D.	Sampling and analysis of subsoil	
1.	Sampling costs 45 hrs. @ $35/hr.	1,575
2.	Analysis costs 19 to 67 samples @ $900/sample	17,100 - 60,300
	Sub-Total D	18,675 - 61,875
E.	Removal and disposal of additional subsoil, if any ($200/cu. yd.)	--[1]
F.	Decontamination of equipment	1,000
G.	Compacted backfill to grade and reseed (3,700 cu. yds. @ $20/cu. yd.)	74,000[2]
H.	Professional certification	
1.	Inspection and certification by a Professional Engineer (32 hrs. @ $60/hr. 10 hrs. @ $40/hr.)	2,320
2.	Administrative costs (30 hrs. @ $50/hr. 10 hrs. @ $20/hr.)	1,700
	Sub-Total H	4,020
	TOTAL (A to H)	$680,395-723,595

[1] Total for subsoil removal can only be estimated when the soil analysis has been completed.

[2] Does not include cost of additional backfill required as a result of additional subsoil removal.


HAULAWAY PARKING
HOURLY PARKING LOT
SALARY PARKING LOT
ASSEMBLY BUILDING
TYPE II FOAM BUILDING
ABRAM STREET
CONTRACTOR'S PARKING LOT
SAMPLE POINT FOR BACKGROUND LEVEL DETERMINATION

ALLIED ANALYTICAL & RESEARCH LABORATORIES

214/337-8666

Chemists
Consultants & Technologists

3031 Glenfield
P.O. Box 24330
Dallas, Texas 75224

May 5, 1983

GM Assembly Division
2525 E. Abrams Street
Arlington, TX 76010
Attn: Don Turnstall

A sample of waste material was submitted for profile analysis for disposal. The project number was 60848.

The methods of analysis employed were those described in the E.P.A. Manual Analysis of Water and Wastes; where applicable. Both wet chemical and intrumental methods were used.

In cases where the analysis involved the determination of a volatile element or compound, i.e. mercury, arsenic, etc., the analytical procedure was carried out on the original sample.

The solids were evaluated by emission spectrographic techniques to determine the approximate concentrations of all cations (metals) that were present. These elements were then quantitatively determined by atomic absorption spectroscopy or ICAP methods.

However, more sensitive and exacting techniques were employed where possible. For example, Mercury was determined on digested portions of the water and sludge, utilizing the flameless cold vapor system described by E.P.A. Determinations of arsenic, selenium, and antimony were accomplished by hydride generation of those elements from a special digestate into an entrained air-argon-hydrogen flame.

Organic contaminants were identified and quantitated using gas chromatography/mass spectrometry (GC/MS). Pesticide Scans were performed by GC/MS, using EPA protocol methodology.

H. Morris Weller
President

ALLIED ANALYTICAL & RESEARCH LABORATORIES

3031 Glenfield
P.O. Box 24330
Dallas, Texas 75224

Chemists
Consultants & Technologists

214/337-3986

March 21, 1983

SAMPLE Liquid

DATE SUBMITTED 1/19/83

IDENTIFYING MARKS See Below

ANALYTICAL REPORT NO. 60848

SUBMITTED BY General Motors Assembly

ADDRESS 2525 East Abrams Street
Arlington, Texas 76010

ANALYSIS

Sample ID: 1 Liquid Sample

A. Waste Characteristics:

1) Phases/Layers: X None
2) Physical State at 70°F: X Semi-Solid
3) Solids: Total(%) 30.4 Total Dissolved (ppm or %) 1555 ppm
4) Specific Weight (as # per unit): 1.665 gm/ml
5) pH: 7.1 (Show the following as range of %)
6) Flash Point greater than 212 °F (Closed Cup Test Only)
7) Vapor Pressure (in mm of Hg at 25°C): water vapor
8) BTU Per #: Doesn't Burn Ash Content 8.5
9) Characteristic Color Black Distinctive Odor Oily
10) Halogenated? no % Sulfonated? no
11) Inorganic Components (with % ranges):
    - Total Cyanide: less than .02 ppm
    - Free Cyanide: NOT DETECTED
    - Sulfide As: 1490 ppm

ALLIED ANALYTICAL & RESEARCH LABORATORIES, BY_____

ALLIED ANALYTICAL & RESEARCH LABORATORIES

3031 Glenfield
P.O. Box 24330
Dallas, Texas 75224

Chemists
Consultants & Technologists

214/337-8888

March 21, 1983

SAMPLE Liquid

DATE SUBMITTED 1/19/83

IDENTIFYING MARKS See Below

ANALYTICAL REPORT NO. 60848
Page 2

SUBMITTED BY General Motors Assembly

ADDRESS 2525 East Abrams Street
Arlington, Texas 76010

ANALYSIS

B. Organic Components

COMPOUNDS	Approx. concentration milligrams/liter
Cyclohexane	1 - 10
Chloroform	1 - 10
Normal Paraffins, C_8-C_{13}	2 - 20
Toluene	.2 - 2
Xylene	.2 - 2
Trimethylbenzenes	.2 - 2
Alkenes, C_8-C_{13}	.2 - 2
Ethyl Xylenes	.2 - 2
Diethyl benzene	.2 - 2
Methyldecylbenzene	.2 - 2

ALLIED ANALYTICAL & RESEARCH LABORATORIES, BY_____

ALLIED ANALYTICAL & RESEARCH LABORATORIES

3031 Glenfield
P.O. Box 24330
Dallas, Texas 75224

Chemists
Consultants & Technologists

214/337-8588

March 21, 1983

SAMPLE Liquid

DATE SUBMITTED 1/19/83

IDENTIFYING MARKS See Below

ANALYTICAL REPORT NO. 60848
Page 3

SUBMITTED BY General Motors Assembly

ADDRESS 2525 East Abrams Street
Arlington, Texas 76010

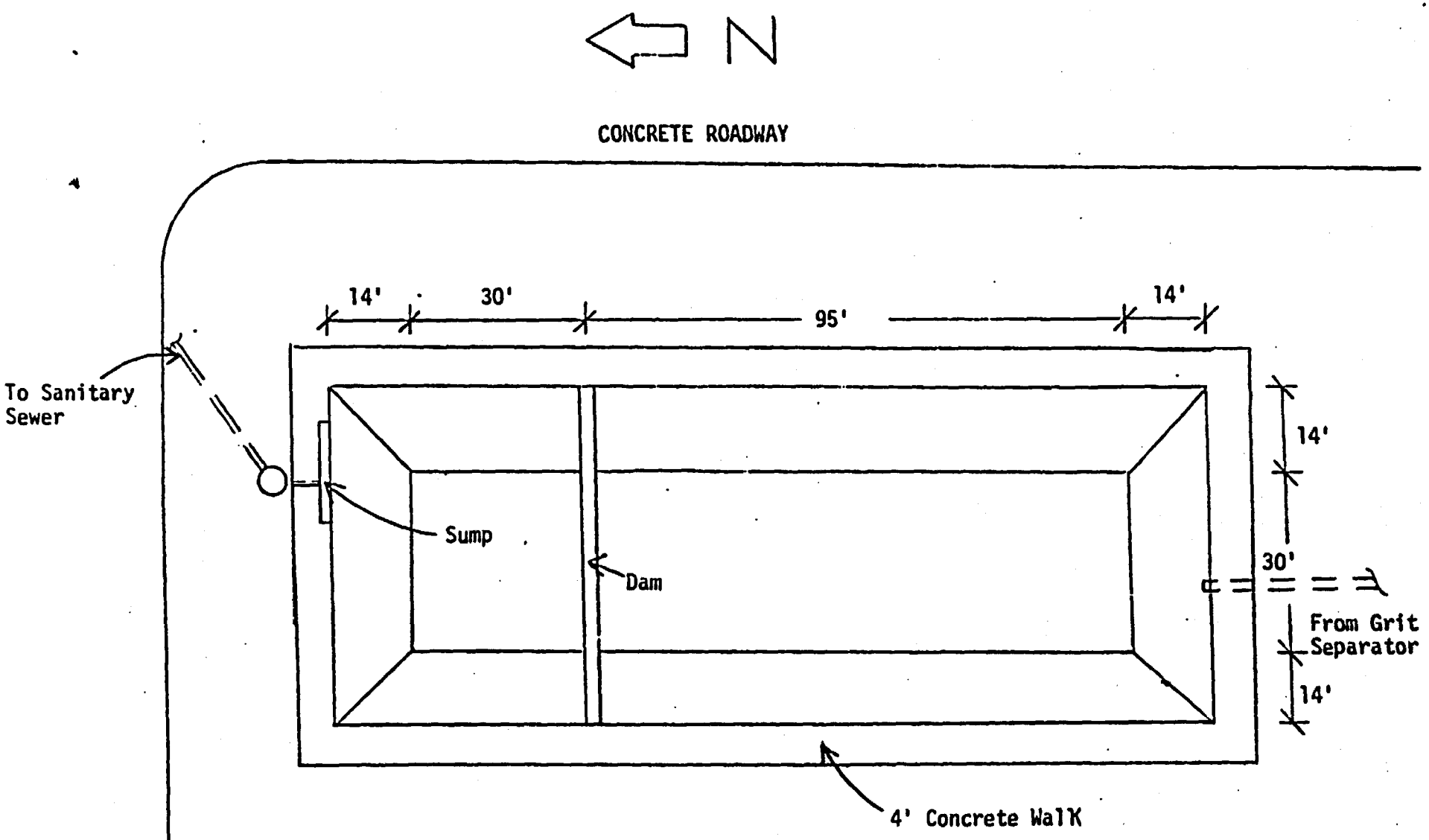
ANALYSIS

C. Heavy Metals	Total	Total Leachable*
	milligrams per liter	
Silver (Ag)	less than 0.05	less than 0.01
Arsenic (As)	less than 1	less than 0.005
Barium (Ba)	855	0.05
Cadmium (Cd)	1.57	less than 0.002
Chromium (Cr)	933	less than 0.006
Copper (Cu)	55.9	3.50
Mercury (Hg)	less than 0.6	less than 0.04
Nickel (Ni)	487	30.4
Lead (Pb)	1260	less than 0.04
Selenium (Se)	less than 1	less than 0.1
Zinc (Zn)	2360	147.5
Pesticides	NOT DETECTED	

*EP Toxicity Data

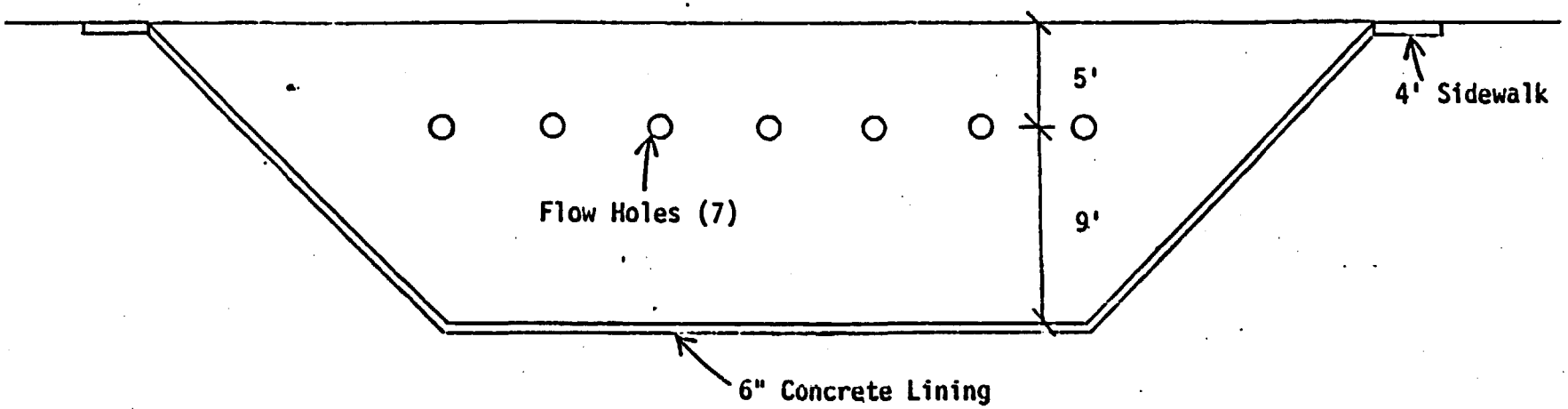
H. Morris Weller, President

ALLIED ANALYTICAL & RESEARCH LABORATORIES, BY



CONCRETE LAGOON

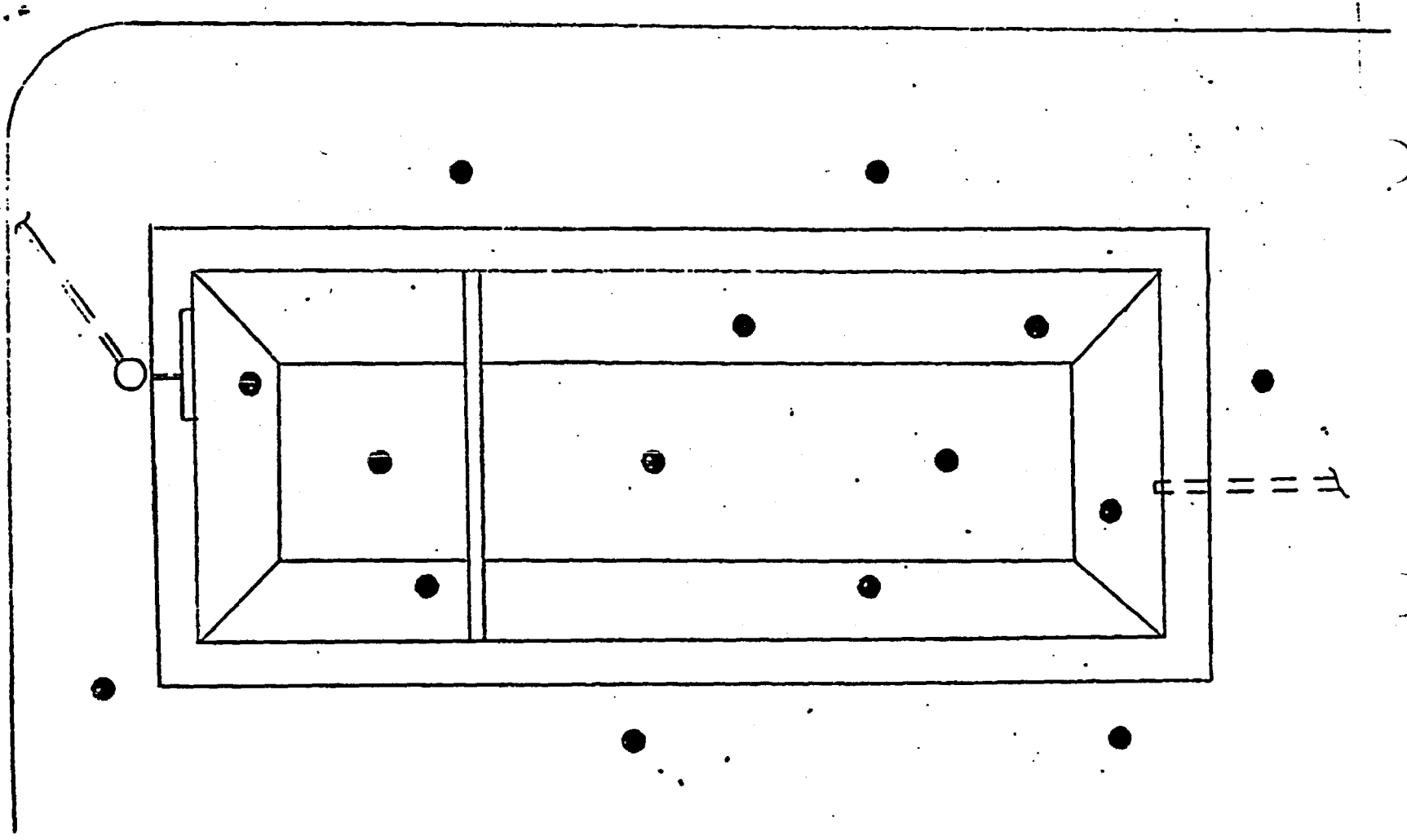
Scale: 1" = 25'



ELEVATION

Scale: 1/8" = 1'-0"

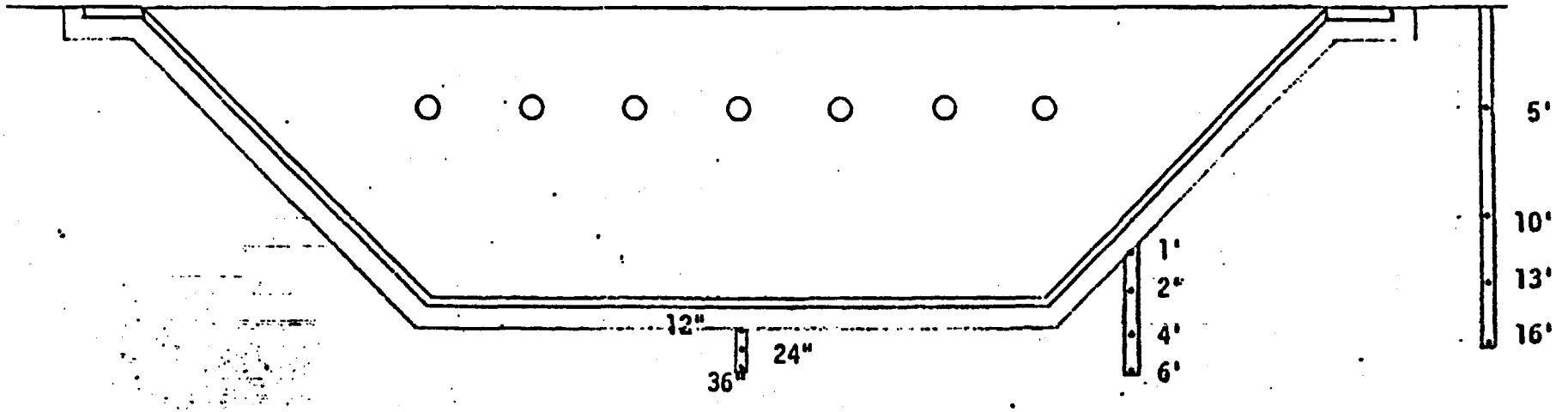
ATTACHMENT D



SOIL SAMPLING LOCATIONS

Scale: 1" = 25'

ATTACHMENT E



SOIL SAMPLING DEPTHS
(TYPICAL)

B. LAGOON CLOSURE SUMMARY

CLOSURE OF GENERAL MOTORS WASTEWATER EQUALIZATION LAGOON

I. SLUDGE REMOVAL

Lagoon wastewater was removed by pumping to the industrial wastewater pretreatment system. All lagoon wastewater was treated by the new pretreatment system prior to discharge to the City of Arlington, Texas sewer system. Wastewater removal was commenced on September 26, 1985 by CECOS/BFI.

After removal of the wastewater, CECOS/BFI began removal of sludge from the lagoon by pumping and dewatering of the sludge through a portable plate and frame filter press. Filtrate from the filter press was discharged to the industrial wastewater pretreatment system for treatment. Dewatered sludge (filter cake) was conveyed to a roll-off container and transported to a liscensed hazardous waste disposal facility operated by CECOS/BFI in Livingston, La. Hazardous wastes manifests were completed for each load and copies of the manifests were kept on file. Examples of the manifest are provided in Section E.

After removing approximately 600 cubic yards of dry filter cake from the lagoon, CECOS/BFI stopped work on October 19, 1985 due to a contract dispute with General Motors. CECOS/BFI decontaminated their equipment using high pressure water and moved off-site by October 22, 1985. All liquids used during decontamination were treated in the industrial wastewater pretreatment facility prior to discharge to the City of Arlington sewer system.

After reviewing alternatives for completion of sludge removal from the lagoon, General Motors contracted with Industrial Cleaning and Degreasing, Inc. to continue removal of the lagoon sludge. Lagoon sludge was pumped into a truck, transported to GM's on-site industrial wastewater treatment facility and pumped into a sludge thickening tank. The sludge was dewatered using the pretreatment plants plate and frame filter presses. Dewatered filter cake was placed into 20 cubic yard roll-off containers and hauled by Chemical Waste Management, Inc. to a liscensed hazardous waste disposal facility in Carlyss, La.

Industrial Cleaning and Degreasing decontaminated their equipment using high pressure water and moved off-site on November 27, 1985. All contaminated water was treated in the on-site industrial wastewater pretreatment facility prior to discharge to the City of Arlington sewer system.

The second phase of sludge removal was begun on November 11, 1985 and completed on November 27, 1985. Chemical Waste Management removed approximately 437 cubic yards of dry filter cake. After spray washing the concrete bottom and sidewalls of the lagoon, the resultant wastewater was pumped out and sent to the on-site industrial pretreatment system for treatment and disposal.

All contaminated soil and filter cake around the loading/unloading area at the lagoon were removed and disposed of with the filter cake by Chemical Waste Management. Hazardous waste manifests were completed for each load

and copies of the manifest are on file. Examples of Chemical Waste Management's manifest are also provided in Section E.

II. SOIL INVESTIGATIONS

Background soil samples were obtained at six locations by Southwestern Laboratories, Inc. as directed in the closure plan. The six samples were composited in equal parts by the laboratory to form one background sample. A summary of sampling and analysis procedures utilized by Southwestern Lab's as well as results of the laboratory analyses are presented in Section D.

Review of EP-Toxicity analytical results from the composite background sample indicated chromium and lead concentrations exceeding maximum allowable contaminant levels. Subsequent reexamination of the remaining portions of the background samples did not identify the source of the metals. Review of the laboratories QC/QA data also did not reveal a laboratory error. As indicated in the laboratory report in Section D, the most likely explanation is a localized area of possible contamination in the background samples.

Since each of the individual background sample analyses were "clean", the average of these background samples was used to compare against the lagoon soil sample results.

Soil samples were obtained from the lagoon as directed by the closure plan. In order to avoid potential delays, additional soil samples were obtained from areas of potential contamination (at cracks in concrete, etc) at depths greater than that specified in the closure plan. A description of these samples, as well as the sampling and analysis procedures used and analytical results obtained, are presented in Section D.

Results of the lagoon soil analyses reveals that the soil beneath the lagoon is virtually free from levels of pollutants greater than 10 times background. Exceptions to this included two occurances of zinc at 0.56 mg/l and 0.36 mg/l, respectively. Subsequent analyses of the next lower level of the affected soils revealed that no pollutants were detected at levels greater than 10 times average background.

As indicated in the laboratory report, polychlorinated biphenyls (PCB's) were found in one (1) of the lagoon samples at a concentration of 3 ppm. However, PCB's were not found in any other sample analyzed and therefore, was an isolated occurance.

As shown in the laboratory report in Section D, pH's were measured for each soil sample. The range of pH's encountered in the lagoon soil were between 6.3 and 7.4. Tests for reactivity and ignitability were performed on samples LI-7 and 8 at Level 1. Results of these tests indicated that none of the lagoon soil samples were ignitable, corrosive or reactive as identified in Federal Regulation 40 CFR 261.

Based upon the above results, the lagoon soil was deemed to be free of contamination as defined in the closure plan and the lagoon closure was allowed to proceed according to plan.

III. CONCRETE AND SOIL REMOVAL

Rollins Environmental Services, Inc. began removal of the concrete liner on December 2, 1985. Rollins broke up the concrete in-place and hauled it to an approved hazardous waste disposal facility for final disposal. A hazardous waste manifest was maintained and copies have been retained on file. An example of a Rollins manifest ticket is shown in Section E.

After the concrete had been removed, additional subsoil was removed from the former lagoon site in accordance with the closure plan. This soil was hauled off-site and disposed of at the same hazardous waste facility as the concrete. A total of approximately 1,016 cubic yards of concrete and dirt were disposed of.

Rollins decontaminated their equipment using high pressure water. All contaminated water was treated in the on-site industrial wastewater pretreatment facility prior to discharge to the City of Arlington sewer system.

IV. AREA RESTORATION

Following removal of the subsoil, the entire excavated area was backfilled with clean, compacted soil. The new soil grade was sloped to prevent accumulation of water on the site, 4 inches of top soil was added, and the area was seeded with rye-grass to prevent erosion.

Restoration work was completed by Rollins on December 20, 1985.

V. PROJECT RECORDS

Copies of field notes, photographs and hazardous waste manifest sheets are permanently on file at General Motors and are available upon request.

C. LAGOON CLOSURE CERTIFICATION

INDEPENDENT PROFESSIONAL ENGINEER CERTIFICATION OF CLOSURE

I, Thomas R. Caldwell, P.E. ,
(Name)

a Registered Professional Engineer, hereby state and certify, to the best of my knowledge and belief, that I have verified that Professional Engineer Closure Certificates were issued for all prior closure activities at the General Motors Assembly Plant, Arlington, Texas; and that I have made visual inspection(s) of the aforementioned facility, and closure of the industrial wastewater equalization lagoon has been performed in accordance with the approved closure plan.

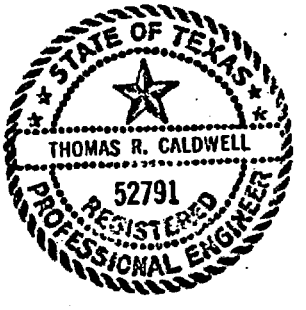
Thomas R. Caldwell — 1/6/85
Signature — Date

52791 — Texas
PE License Number — For State of

12700 Hillcrest Road, Suite 125
Business Address

Dallas, Texas 75230
City/State/Zip Code

(214) 980-0001
Business Telephone (With Area Code)



D. LABORATORY REPORT

ENVIRONMENTAL SOIL SAMPLING AND ANALYSIS

TRADE WASTE LAGOON CLOSURE, ARLINGTON PLANT

ARLINGTON, TEXAS

Prepared For
General Motors Corporation
GM Assembly Division, Arlington Plant
Arlington, Texas

January 7, 1986
SwL Report No. 85-1468-1 (REV.)

SwL

SOUTHWESTERN LABORATORIES
North Texas Region Geotechnical Division

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services

2575 Lone Star Drive • P.O. Box 224227 • Dallas, Texas 75264 • 214/263-1133

January 7, 1986

General Motors Corporation
GM Assembly Division, Arlington Plant
Engineering Department
2525 East Abram Street
Arlington, Texas 76011

Attention: Mr. Kent Moon

Re: Environmental Soil Sampling & Analysis
Trade Waste Lagoon Closure, Arlington Plant
Arlington, Texas
SwL Report No. 85-1468-1 (REV.)

Gentlemen:

Submitted herewith are our results of soil sample analyses for the referenced project. This work was performed in accordance with our proposal of August 26, 1985 and GM Purchase Order No. AR41748, dated September 11, 1985.

An Interim Report with results from the tested background and exterior boring samples was previously submitted on October 25, 1985. This report contains results from the Interim Report along with the additional results from our recently completed tests on the interior boring samples.

Field sampling methods, Boring Location Diagrams, and Boring Logs are included in Appendix A. Laboratory test procedures and results are included in Appendix B along with related supporting information.

It has been a pleasure to perform this work for you. If you have any questions about information in this report or if we can be of further assistance, please do not hesitate to contact us.

Sincerely,

SOUTHWESTERN LABORATORIES, INC.

Irene C. Hadley
Analytical Services

Bruce Bailey, Ph.D., P.E.
Geotechnical Engineering Division

ICH/BB/bkf

3CC: HDR Environmental Technologies

APPENDIX A

APPENDIX A: FIELD SAMPLING

Field Sampling Methods

The soil samples from the lagoon area were obtained from soil borings designated as follows:

B - Background

LE - Lagoon Exterior

LI - Lagoon Interior

The background and exterior borings were drilled using a truck mounted, auger rig on September 16, 1985, prior to final lagoon cleanout and demolition. The interior borings were drilled during the initial stages of the liner demolition activities using a hand power auger to advance the borings on December 3 and 4, 1985. The interior borings were drilled through holes broken through the concrete liner. The bottom interior borings (Borings LI-7, LI-8, and LI-9) were filled with grout after completion.

The boring locations are shown in the Boring Location Diagrams in accordance with the Lagoon Closure Plan. All borings were drilled and samples obtained under the direct supervision of our Field Geologist.

SwL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

December 9, 1985 File No. Report 5

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 12/4/85; Delivered by Bob Sneed

Identification: Trade Waste Lagoon Closure

	LE-2 Level 2	LI-4 Level 3	LI-4 Level 4	LI-7 Level 4
Arsenic (ppm)	*0.1	*0.1	*0.1	*0.1
Barium (ppm)	0.2	0.2	0.1	0.1
Cadmium (ppm)	*0.01	*0.01	*0.01	*0.01
Chromium (ppm)	*0.05	*0.05	*0.05	*0.05
Lead (ppm)	0.2	*0.1	0.1	0.2
Selenium (ppm)	*0.1	*0.1	*0.1	*0.1
Silver (ppm)	*0.01	*0.01	*0.01	*0.01
Nickel (ppm)	*0.05	*0.05	*0.05	0.06
Zinc (ppm)	*0.01	*0.01	*0.01	0.01
Mercury (ppm)	*0.05	*0.05	*0.05	*0.05
Endrin (ppb)	*.2	*.2	*.2	*.2
Lindane (ppb)	*4.0	*4.0	*4.0	*4.0
Methoxychlor (ppm)	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*5.0	*5.0	*5.0	*5.0
2,4-D (ppm)	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01
pH	7.2	6.3	6.8	6.7

Distribution of report:
3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Servi

002
Lab. No. D-24210-3 /cdr

SwL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

December 20, 1985 File No. Report 6

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 12/4/85; Delivered by Bob Sneed

Identification: Trade Waste Lagoon Closure
LI-7 and LI-8, Level 1

Reactivity:

Flash-Point (ASTM D-98/80) greater than 150°.

Non-reactive with water.

Non-explosive when mixed with water

When mixed with water, does not generate toxic gases, vapors, or fumes of a sufficient quantity to present a danger to human health or the environment.

Contains less than 5 mg/Kg Sulfide.

Contains less than 5 mg/Kg Cyanide.

Does not detonate or explode when heated.

Distribution of report:

3c-Southwestern Laboratories-Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Servi

002
Lab. No. D-24210 /cdr

Discussion of QA/QC Program and Laboratory Worksheets

The samples were obtained using new, 2-inch diameter Shelby tube soil samplers, 24 inches in length, which had been cleaned in the laboratory with acetone and tap water. In the field, the samplers were again cleaned using high pressure water and steam before use. In addition, the drilling augers were similarly cleaned with high pressure water and steam between borings.

After the samples were obtained from the borings, they were sealed in foil, identified and stored on ice for transporting to the laboratory.

The background samples were obtained from shallow depths of 2.5 to 4.5 feet. Samples were obtained from four depths in the exterior (LE) borings, identified as follows:

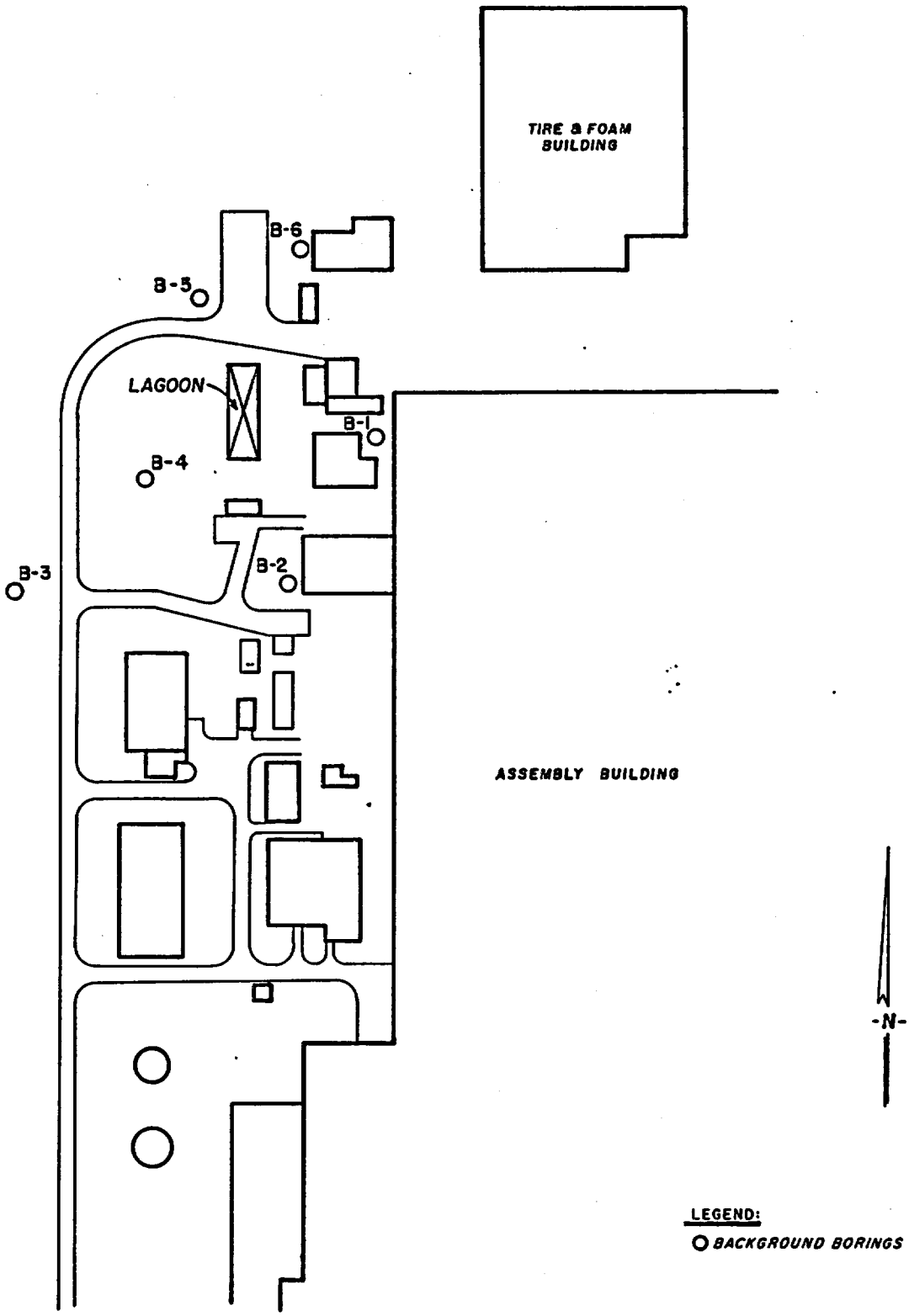
Designation	Nominal Depth, feet
Level 1	5
Level 2	10
Level 3	13
Level 4	16

Samples were also obtained from four depths (below the concrete liner surface) in the interior (LI) borings, identified as follows:

Designation	Nominal Depth, feet
Level 1	2.1
Level 2	3.1
Level 3	5.0
Level 4	6.8

Soil stratigraphy, based on visual identification of soils found in the borings, also is included on the Boring Logs in this Appendix.

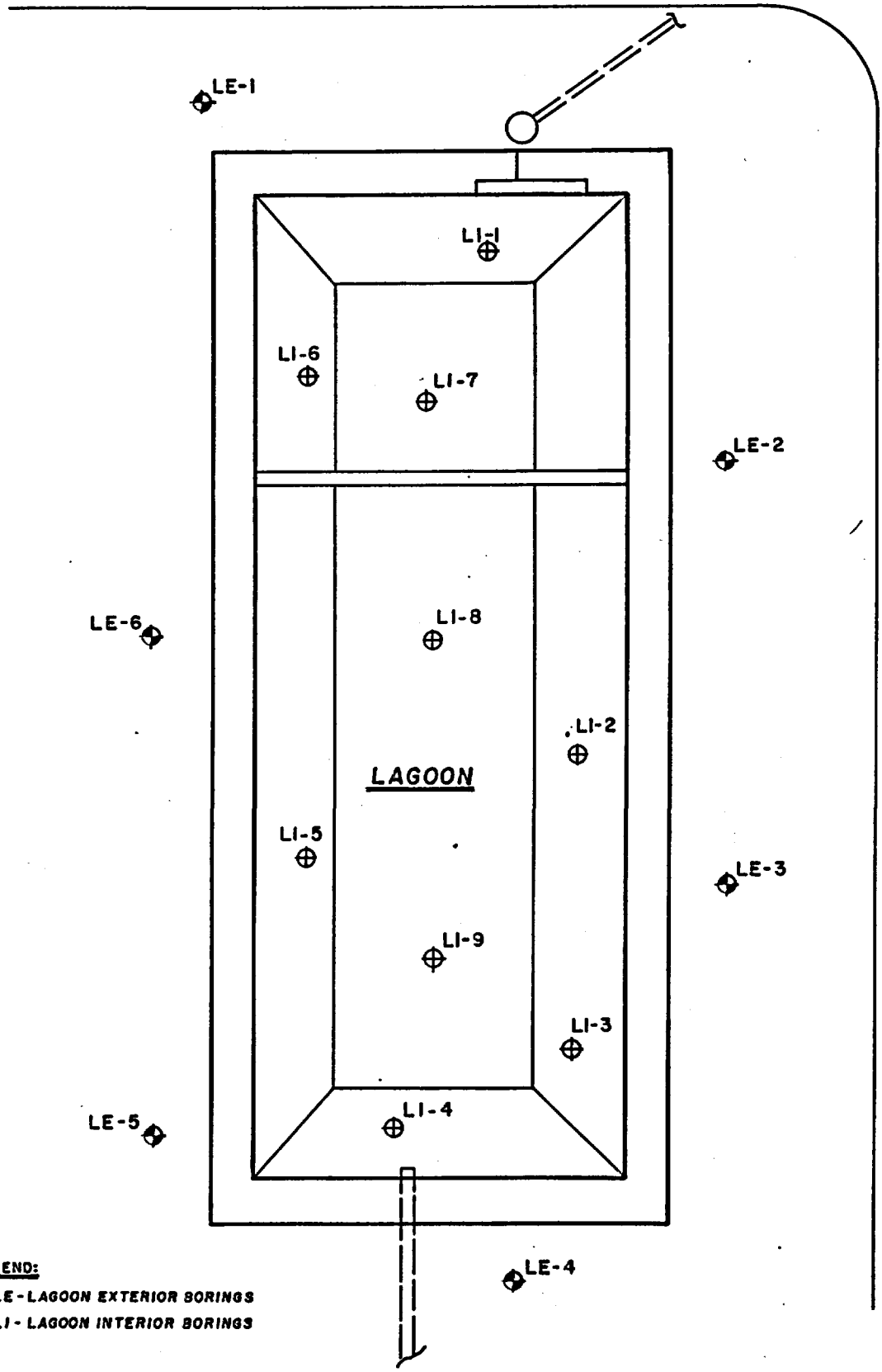
SOUTHWESTERN LABORATORIES



PROJECT/TITLE

ENVIRONMENTAL SOIL SAMPLING, LAGOON CLOSURE

BORING LOCATION DIAGRAM		SITE LOCATION ARLINGTON, TEXAS	
SWL 85-1468	SCALE: NONE	DATE: SEPT. 20, 1985	DRAWN BY: J. E. D.



PROJECT / TITLE			
ENVIRONMENTAL SOIL SAMPLING, LAGOON CLOSURE			
BORING LOCATION DIAGRAM		SITE LOCATION ARLINGTON, TEXAS	
SWL 85-1468	SCALE: 1" = 25'	DATE: SEPT. 19, 1985	DRAWN BY: J. E. D.

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
BORING NO.: B-1
CLIENT: General Motors Corporation, Arlington Plant
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Dry at completion

DESCRIPTION OF STRATUM
6" Concrete - Tan sand
Tan and shaley brown sandy clay with tannish shaley clay
Bottom of Hole at 3'

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
BORING NO.: B-2
CLIENT: General Motors Corporation, Arlington Plant
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION	DESCRIPTION OF STRATUM
2		■				Dry at completion	Tan and tannish gray shaley clay with silty seams
4							Bottom of Hole at 2.5'
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: B-3
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Tan sand
2					Brown clay with lime pebbles
4					Bottom of Hole at 2.5'
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					

LEGEND:
■ SAMPLE
X STANDARD PENETRATION
▼ WATER

WATER INFORMATION
Dry at completion

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: B-4
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION	DESCRIPTION OF STRATUM
2						Dry at completion	Brown sandy clay with tree root seams
4							Tannish brown silty clay with lime seams and lime pebbles
6				*			Bottom of Hole at 4.5'
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: B-5
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Tan sand
2					Tan and brown sandy clays - fine
4					Bottom of Hole at 2.5'
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					

LEGEND:
■ SAMPLE
X STANDARD PENETRATION
▼ WATER

WATER INFORMATION
Dry at completion

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: B-6
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
					Tan sand with gravel (fill)
2					Brown clay
					Tan limy clay with lime seams and pebbles
4					Bottom of Hole at 4'
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					

LEGEND:
- ■ SAMPLE
- X STANDARD PENETRATION
- ▼ WATER

WATER INFORMATION: Dry at completion

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: LE-1
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
2					Broken clays with roots and rocks (fill)
4					
6					Tan and gray shaley clay with rust and silt seams
8					
10					
12					
14					
16					
18					Bottom of Hole at 16.5'
20					
22					
24					
26					

LEGEND:
- ■ SAMPLE
- X STANDARD PENETRATION
- ▼ WATER

WATER INFORMATION

Dry at completion

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: LE-2
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Dry at completion

DESCRIPTION OF STRATUM
Tan sand
Tannish and gray shaley clay with silt seams
Bottom of Hole at 16.5'

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: LE-3
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Dry at completion

DESCRIPTION OF STRATUM
Brown clays and tan sands
Tan and tannish brown and gray shaley clay with silty seams
Bottom of Hole at 16.5'

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: LE-4
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	DESCRIPTION OF STRATUM
2					Brown and tan clays with wire fence and boards (fill)
4					Tan and tannish brown and gray shaley clay with silt seams
6					
8					
10					
12					
14					
16					
18					Bottom of Hole at 17'
20					
22					
24					
26					

LEGEND:
■ SAMPLE
X STANDARD PENETRATION
▼ WATER

WATER INFORMATION

Dry at completion

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: L-E-5
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Dry at completion

DESCRIPTION OF STRATUM

DEPTH IN FEET	DESCRIPTION OF STRATUM
2	Brown clays (jointed) with roots and rocks (fill)
4	
6	Tan and gray shaley clay with rust and silt seams
8	
10	
12	
14	
16	
18	Bottom of Hole at 16.5'
20	
22	
24	
26	

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation, Arlington Plant

BORING NO.: LE-6
LOCATION: Arlington, Texas

DATE: 9-16-85 TYPE: Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Dry at completion

DESCRIPTION OF STRATUM
Jointed clays (fill)
Tan and grayish shaley clay with rust and silt seams
Bottom of Hole at 16.5'

2 4 6 8 10 12 14 16 18 20 22 24 26

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation,

BORING NO.: LI-1
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Water noted at 6'

DESCRIPTION OF STRATUM

4" Concrete

Tan and gray shaley silty clay

Bottom of boring at 7.5'

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-2
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						No seepage noted

DESCRIPTION OF STRATUM

10" Concrete

Tan and gray shaley clay

Bottom of boring at 7.5'

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-3
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION

DESCRIPTION OF STRATUM

9.5" Concrete

Tan and gray shaley silty clay

Bottom of boring at 7.5'

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-4
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION

DESCRIPTION OF STRATUM

10" Concrete

Tan and tannish brown shaley silty clay

Bottom of boring at 7.5'

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-5
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						No seepage noted

DESCRIPTION OF STRATUM

10" Concrete

Tan and gray shaley clay

-noted bentonite seam at 4'

Bottom of boring at 7.5'

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-6
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION

DESCRIPTION OF STRATUM

10" Concrete

Tan and gray shaley clay with bentonite seams

Bottom of boring at 7.5'

SOUTHWESTERN LABORATORIES

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-7
LOCATION: Arlington, Texas

DATE: 12/3/85
TYPE: Hand Power Auger
CASED TO:
GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Noted seepage at 1'

DESCRIPTION OF STRATUM

10" Concrete

Tan and gray shaley clay

Bottom of boring at 7.5'

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-8
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Seepage noted at 1'

DESCRIPTION OF STRATUM

10" Concrete

Tan and gray shaley clay

Bottom of boring at 7.5'

LOG OF BORING

PROJECT: Environmental Soil Sampling, Lagoon Closure
CLIENT: General Motors Corporation

BORING NO.: LI-9
LOCATION: Arlington, Texas

DATE: 12/3/85 TYPE: Hand Power Auger CASED TO: GROUND ELEVATION:

DEPTH IN FEET	SYMBOL	SAMPLE	STANDARD PENETRATION BLOWS/ft.	HAND PEN. tsf.	LEGEND: ■ SAMPLE, X STANDARD PENETRATION, ▼ WATER	WATER INFORMATION
						Seepage noted at 1'

DESCRIPTION OF STRATUM

10" Concrete

Tan and gray shaley clay

Bottom of boring at 7.5'

SOUTHWESTERN LABORATORIES

APPENDIX B

APPENDIX B: LABORATORY ANALYSES, PROCEDURES AND RESULTS

In the laboratory, the samples were stored in the freezer for subsequent testing. Samples selected for testing were extruded under the direct supervision of a Chemist and the ends and exterior of the samples were trimmed to obtain test specimens of approximately 400 grams from near the center of the samples. Untested samples and the remaining portions of tested samples have been retained in freezer storage.

The tests were performed in accordance with the project parameter list developed by the client included in Table 1.

The following test procedures were used in these analyses:

Inorganic Sample Test Procedures:

Soils to be tested for EP Tox Metals were extracted according to EPA SW-846 Method 1310. The metals were analyzed using the following EPA SW-846 Method Numbers: 7060, 7080, 7130, 7190, 7421, 7470, 7520, 7740, 7760, 7950.

Organic Sample Test Procedures:

Pesticides and Herbicides:

Soil was extracted according to EPA SW-846 Method 1310 (EP Toxicity Extraction). Analysis was carried out by Gas Chromatography using electron detection, and utilizing capillary columns.

Table 1: Project Parameter List

Arsenic
Barium
Cadmium
Chromium
Lead
Selenium
Silver
Nickel
Zinc
Mercury
Endrin
Lindane
Methoxychlor
Toxaphene
2,4-D
2,4,5-TP Silvex
Benzene
Xylene
Bis-2Ethyl Hexyl Phthalate
ButylBenzalPhthalate
Carbon Tetrachloride
Cis-1,3-dichloropropylene
Cyclohexane
Diethyl Phthalate
Di-n-butyl Phthalate
Di-n-octyl phthalate
Ethyl Benzene
Methylene Chloride
Napthalene
1,1,2-Trichloroethane
pH

Volatile Organics and Phthalate Esters:

Soils were extracted by a method similar to EPA SW-846 Method 5020. The soil was mixed with 10% Sodium Sulfate. 1ml Iso-octane was added to this mixture. Chlorobenzene was used as an internal standard. The mixture was then heated so as to force the volatile organics from the soil into the Iso-octane. 1ml of the Iso-octane sample was injected into a Gas Chromatograph fitted with capillary columns. Flame Ionization Detection was utilized for Aromatic Volatile Organics. Electron Capture Detection was utilized for Chlorinated Volatile Organics and Phthalate Esters.

The test results are summarized in six reports (Reports 1 through 6) in the following pages.

Report 1 includes the project parameter list results for a composite background sample (composited using equal parts by weight from each location) and for the Level 1 samples from the exterior borings (LE borings). Several high readings, notably chromium and lead, were found in the composite background sample. As a result of this finding and to determine which of the samples contained these higher contaminant levels, additional selected tests were performed on the individual background samples as included in Report 2. These test results did not indicate the higher contaminant levels and this difference in findings is attributed to different findings for different segments of the individual soil samples It was concluded that the composite sample contained a limited contaminated soil zone which was localized and did not appear again in the sample segments tested and included in Report 2.

The bottom samples in the LE-borings (Level 4) were also analyzed for the project parameter list. These results are also included in Report 2.

Report 3 includes results of a PCB finding that appeared during the Gas Chromatograph analysis on the sample from Level 4 in Boring LE-1. PCB's were not detected in the remaining samples.

Report 4 contains the results for the project list parameters for Level 1 in the interior borings (LI borings).

Results of project list parameter tests for selected samples from greater depths in interior Borings LI-4 and LI-7 and from intermediate depths in exterior Boring LE-2 are included in Report 2.

Report 6 includes results of ignitability and reactivity characteristic tests for one selected sample.

Following these reports are a discussion of our in-house QA/QC Program and copies of our laboratory worksheets for blank, spike and duplicate sample tests.

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1/6/86
-issued Report

January 6, 1986 File No. Report 1

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 9/17/85

Identification: Trade Waste Lagoon Closure; GM Arlington Plant
Level 1 (5' Depth in LE Borings)

	Background Composite	LE-1	LE-2	LE-3
Arsenic (ppm)	1.7	*.1	*.1	*.1
Barium (ppm)	.2	1.7	.4	.4
Cadmium (ppm)	.23	.01	.02	.01
Chromium (ppm	26.3	*.05	*.05	*.05
Lead (ppm)	16.3	*.01	*.01	.20
Selenium (ppm)	*.1	*.1	*.1	*.1
Silver (ppm)	*.01	*.01	*.01	.13
Nickel (ppm)	.85	.08	*.05	.14
Zinc (ppm)	2.74	.14	*.01	*.01
Mercury (ppm)	*.05	*.05	*.05	*.05
Endrin (ppb)	*.2	*.2	*.2	*.2
Lindane (ppb)	*.4	*.4	*.4	*.4
Methoxychlor (ppm)	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*.5	*.5	*.5	*.5
2,4-D (ppm)	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*0.1	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01
pH	7	7.4	7.7	7.5

* None detected, less than

Distribution of report:
3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Servi

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1/6/86
Re-issued Report

January 6, 1986 File No. Report 1

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 9/17/85

Identification: Trade Waste Lagoon Closure; GM Arlington Plant
Level 1 (5' Depth in LE Borings)

	LE-4	LE-5	LE-6
Arsenic (ppm)	*.1	.2	*.1
Barium (ppm)	.5	1.7	*.1
Cadmium (ppm)	*.01	*.01	*.01
Chromium (ppm	*.05	*.05	*.05
Lead (ppm)	*.1	*.1	*.1
Selenium (ppm)	.2	.3	*.1
Silver (ppm)	*.01	.03	.01
Nickel (ppm)	.12	*.05	*.05
Zinc (ppm)	*.01	.53	*.01
Mercury (ppm)	*.05	*.05	*.05
Endrin (ppb)	*.2	*.2	*.2
Lindane (ppb)	*.4	*.4	*.4
Methoxychlor (ppm)	*.1	*.1	*.1
Toxaphene (ppb)	*.5	*.5	*.5
2,4-D (ppm)	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01
pH	7.5	7.5	7.8

* None detected, less than

Distribution of report:
3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Servic

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1/6/86
Re-issued Report

January 6, 1986 File No. Report 2

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 9/17/85

Identification: Trade Waste Lagoon Closure
Background

	B-1	B-2	B-3	B-4	B-5	B-6
Arsenic (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Barium (ppm)	3.0	1.2	*.1	.1	1.1	1.0
Cadmium (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Chromium (ppm)	*.05	*.05	*.05	*.05	*.05	*.05
Lead (ppm)	*.1	*.1	*.1	*.1	.3	*.1
Nickel (ppm)	.14	.20	*.05	*.05	.06	.09
Zinc (ppm)	.04	.01	*.01	*.01	.02	.03
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
ButylBenzalphthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-octyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
pH	7.5	7.4	7.0	6.9	7.2	7.1

* None detected, less than

Distribution of report:
3c-Southwestern Laboratories-Geotech

Respectfully submitted,

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Per: Irene C. Hadley
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Re-issued Report

January 6, 1986 File No. Report 2

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 9/17/85

Identification: Trade Waste Lagoon Closure
Level 4 (16' Depth in LE Borings)

	LE-1	LE-2	LE-3	LE-4	LE-5	LE-6
Arsenic (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Barium (ppm)	.8	.2	*.1	.6	2.1	.4
Cadmium (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Chromium (ppm	*.05	*.05	*.05	*.05	*.05	*.05
Lead (ppm)	*.1	.1	*.1	.1	.2	.2
Selenium (ppm)	.1	*.1	*.1	.2	.2	.2
Silver (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Nickel (ppm)	*.05	*.05	*.05	.09	*.05	*.05
Zinc (ppm)	*.01	*.01	*.01	*.01	.11	.01
Mercury (ppm)	*.05	*.05	*.05	*.05	*.05	*.05
Endrin (ppb)	*.2	*.2	*.2	*.2	*.2	*.2
Lindane (ppb)	*.4	*.4	*.4	*.4	*.4	*.4
Methoxychlor (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*.5	*.5	*.5	*.5	*.5	*.5
2,4-D (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01	*.01	*.01
pH	7.3	7.3	7.2	7.1	7.4	7.3

* None detected, less than

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Respectfully submitted,

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October 24, 1985 File No. Report 3

Report of: Analysis of Soil

Reported to: Southwestern Laboratories, Inc.
Attn: Mr. Bruce Bailey

Date received: 9-17-85

Identification: Trade Waste Lagoon Closure; Level 16', LE-1

Gas Chromatograph analysis of this sample indicated the presence of polychlorinated biphenyl (PCB). Subsequently, the sample was extracted and specifically analyzed for PCB content. The sample contained 3ppm PCB. Please note that PCB's were not detected in the other LE samples analyzed.

Analyst: ML

Distribution of report: 3c-SWL-Geotechnical Division

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Servi

002
Lab. No. D-23985 /cll

SwL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

December 9, 1985 File No. Report 4

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 12/4/85; Delivered by Bob Sneed

Identification: Trade Waste Lagoon Closure,
Level 1

	LI-1	LI-2	LI-3	LI-4	LI-5
Arsenic (ppm)	0.1	*0.1	0.1	*0.1	0.1
Barium (ppm)	0.4	0.6	0.1	5.9	0.3
Cadmium (ppm)	*0.01	*0.01	*0.01	*0.01	0.01
Chromium (ppm)	*0.05	*0.05	*0.05	*0.05	*0.05
Lead (ppm)	0.3	0.3	0.2	0.2	0.1
Selenium (ppm)	0.1	*0.1	0.1	*0.1	*0.1
Silver (ppm)	*0.01	*0.01	*0.01	*0.01	*0.01
Nickel (ppm)	0.07	*0.05	0.06	0.29	0.08
Zinc (ppm)	0.05	0.06	0.05	0.56	0.05
Mercury (ppm)	*0.05	*0.05	*0.05	*0.05	*0.05
Endrin (ppb)	*.2	*.2	*.2	*.2	*.2
Lindane (ppb)	*4.0	*4.0	*4.0	*4.0	*4.0
Methoxychlor (ppm)	*.1	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*5.0	*5.0	*5.0	*5.0	*5.0
2,4-D (ppm)	*.1	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01	*.01
pH	6.6	7.0	6.9	7.0	7.2

* None detected, less than

Distribution of report:
3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Serv

002
Lab. No. D-24210-1 /cdr

SwL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

December 9, 1985 File No. Report 4 (Continued)

Report of: Analysis of Soil

Reported to: Southwestern Laboratories-Geotechnical Division
Attn: Bruce Bailey

Date received: 12/4/85; Delivered by Bob Sneed

Identification: Trade Waste Lagoon Closure •
Level 1

	LI-6	LI-7	LI-8	LI-9
Arsenic (ppm)	0.1	*0.1	*0.1	*0.1
Barium (ppm)	0.1	6.6	0.3	*0.1
Cadmium (ppm)	*0.01	*0.01	*0.01	*0.01
Chromium (ppm	*0.05	*0.05	*0.05	*0.05
Lead (ppm)	0.1	0.2	0.2	*0.1
Selenium (ppm)	*0.1	*0.1	*0.1	*0.1
Silver (ppm)	*0.01	*0.01	*0.01	*0.01
Nickel (ppm)	0.07	0.15	0.13	0.08
Zinc (ppm)	0.03	0.36	0.05	0.01
Mercury (ppm)	*0.05	*0.05	*0.05	*0.05
Endrin (ppb)	*.2	*.2	*.2	*.2
Lindane (ppb)	*4.0	*4.0	*4.0	*4.0
Methoxychlor (ppm)	*.1	*.1	*.1	*.1
Toxaphene (ppb)	*5.0	*5.0	*5.0	*5.0
2,4-D (ppm)	*.1	*.1	*.1	*.1
2,4,5-TP Silvex (ppm)	*.01	*.01	*.01	*.01
Benzene (ppm)	*.5	*.5	*.5	*.5
Xylene (ppm)	*.1	*.1	*.1	*.1
Bis-2Ethyl Hexyl Phthalate (ppm)	*.1	*.1	*.1	*.1
-ButylBenzalPhthalate (ppm)	*.1	*.1	*.1	*.1
Carbon Tetrachloride (ppm)	*.01	*.01	*.01	*.01
Cis-1,3-dichloropropylene (ppm)	*.1	*.1	*.1	*.1
Cyclohexane (ppm)	*.1	*.1	*.1	*.1
Diethyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-butyl Phthalate (ppm)	*.1	*.1	*.1	*.1
Di-n-octyl phthalate (ppm)	*.1	*.1	*.1	*.1
Ethyl Benzene (ppm)	*.1	*.1	*.1	*.1
Methylene Chloride (ppm)	*.1	*.1	*.1	*.1
Naphthalene (ppm)	*.1	*.1	*.1	*.1
1,1,2-Trichloroethane (ppm)	*.01	*.01	*.01	*.01
pH	7.0	6.9	7.1	7.0

* None detected, less than

Distribution of report:
3c-Southwestern Laboratories/Geotech

Respectfully submitted,

SOUTHWESTERN LABORATORIES, INC.

Per: Irene C. Hadley
Assistant Manager, Analytical Servi

002
Lab. No. D-24210-2 /cdr

SwL

SOUTHWESTERN LABORATORIES
Dallas Division

Materials, environmental and geotechnical consultation, fundamental testing and analytical services
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75284 • 214/631-2700 Metro 263-1133

Southwestern Laboratories, Dallas, QA/QC Program

The Southwestern Laboratories-Dallas Analytical Services Quality Assurance (QA)/ Quality Control (QC) program is utilized in order to insure the reliability of analytical data. The purpose of QA/QC is to monitor the accuracy and precision of results obtained and reported.

In order to verify the precision of methods, a minimum of ten percent of all samples are duplicated. A blank (zero percent) and a spike (known percent) are analyzed with each set of samples. An applicable standard is run with each set of samples. More than one standard may be required if several compounds are to be quantitated. When relevant, method of standard additions is performed.

The Southwestern Laboratories-Dallas QA/QC report form is completed immediately following the completion of an analysis. QA/QC performance records are maintained on file.

Various instruments utilized in analyses are calibrated on a regular basis. A record of said calibration is maintained in a log book or kept on file.

SWL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME L. THOMPSON DATE 10/9/95

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.	D
23758 (COMPOSITE BACKGROUND) + LE1-6								
Cr-7	<0.05					25.6	27.0	2.
Pb-7	<0.1					15.9	16.7	2.
Se-7	<0.1					<0.1	<0.1	0
As-7	<0.1					1.6	1.8	5
Cd-7	<0.1					0.2	0.1	33
Cu-7	<0.1					0.17	0.14	17
Ag-7	<0.01					<0.01	<0.01	1
Zn-7	<0.01					2.81	2.66	2.
Ni-7	<0.05					1.0	0.7	17

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

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Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME L. THOMPSON DATE 12/6/95

TYPE & NUMBER OF ANALYSIS 24210-A-I	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
As -10	<0.1	0.1	5.0	5.1	100	<0.1	<0.1
Ba -10	<0.1	0.1	5.0	5.1	100	5.8	6.0
Cd -10	<0.01	<0.01	5.00	4.77	95	<0.01	<0.01
Cr -10	<0.05	<0.05	5.00	4.96	100	<0.05	<0.05
Pb -10	<0.1	0.2	5.0	4.9	94	0.2	0.2
Hg -10	<0.01	<0.01	0.01	0.01	100	<0.05	<0.05
Se -10	<0.1	<0.1	5.0	5.5	110	<0.1	<0.1
Ag -10	<0.01	<0.01	5.00	5.28	106	<0.01	<0.01
Ni -10	<0.05	0.07	5.00	5.14	101	0.29	0.30
Zn -10	<0.01	0.03	5.00	5.15	102	0.36	0.36
LEVEL-1							
A = L1-1							
B = L1-2							
C = L1-3							
D = L1-4							
E = L1-5							
F = L1-6							
G = L1-7							
H = L1-8							
I = L1-9							

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
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APPROVED _____ DATE _____

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P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME L. THOMPSON DATE 12/10/95

TYPE & NUMBER OF ANALYSIS 2420 - P, R, S Acid Blank	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
As -4	<0.1	<0.1	5.0	5.1	102	<0.1	<0.1
Ba -4	<0.1	0.1	5.0	5.4	108	0.2	0.2
Cd -4	<0.01	<0.01	5.00	5.42	108	<0.01	<0.01
Cr -4	<0.05	<0.05	5.00	5.24	104	<0.05	<0.05
Pb -4	<0.1	0.1	5.0	5.4	108	0.2	0.2
Se -4	<0.1	<0.1	5.0	5.7	114	<0.1	<0.1
Ag -4	<0.01	<0.01	5.00	5.34	106	<0.01	<0.01
Ni -4	<0.05	0.06	5.00	5.06	101	<0.05	<0.05
Zn -4	<0.01	0.01	5.00	5.06	101	<0.05	<0.05
1410 P-3							

P = LF-2, LEVEL 2
Q = LI-4; LEVEL 3
R = LI-4; LEVEL 4
S = LI-1; LEVEL 4

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
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APPROVED _____ DATE _____

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SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME L. THOMPSON DATE 12/10/85

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	ORIGINAL CONC.	SPIKE(S) ADDED CONC.	FINAL CONC.	% REC.	DUPLICATE(S) 1ST CONC.	2ND CONC.
24210 - P, R, S AND BLANK							
As -4	<0.1	<0.1	5.0	5.1	102	<0.1	<0.1
Ba -4	<0.1	0.1	5.0	5.4	108	0.2	0.2
Cd -4	<0.01	<0.01	5.00	5.42	108	<0.01	<0.01
Cr -4	<0.05	<0.05	5.00	5.24	104	<0.05	<0.05
Pb -4	<0.1	0.1	5.0	5.4	108	0.2	0.2
Se -4	<0.01	<0.1	5.0	5.7	114	<0.1	<0.1
Ag -4	<0.01	<0.01	5.00	5.34	108	<0.01	<0.01
Ni -4	<0.05	0.01	5.00	5.06	101	<0.05	<0.05
Zn -4	<0.01	0.01	5.00	5.06	101	<0.05	<0.05
24210 P-S							

P = LI-2, LEVEL 2
Q = LI-4; LEVEL 3
R = LI-4; LEVEL 4
S = LI-7; LEVEL 4

BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.

SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.

DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME L. THARSEN DATE 12/11/25

TYPE & NUMBER OF ANALYSIS 2470-Q Hg FOR P,Q,R,S	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
As -1	<0.1	<0.1	5.0	5.4	108	<0.1	<0.1
Cd -1	<0.1	0.1	5.0	5.5	108	0.2	0.2
Cr -1	<0.01	<0.01	5.00	5.40	108	<0.01	<0.01
Cr -2	<0.05	<0.05	5.00	5.36	107	<0.05	<0.05
Pb -1	<0.1	<0.1	5.0	5.3	106	<0.1	<0.1
Hg -1	<0.01	<0.01	0.01	0.01	100	<0.01	<0.01
Se -1	<0.1	<0.1	5.0	5.6	112	<0.1	<0.1
Ag -1	<0.01	<0.01	5.00	5.30	106	<0.01	<0.01
Ni -1	<0.05	<0.05	5.00	5.12	102	<0.05	<0.05
Zn -1	<0.01	<0.01	5.00	5.07	101	<0.01	<0.01

BLIC - Q
Hg - P, S

P = LE-2; LEVEL 2
Q = L1-4; LEVEL 3
R = L1-4; LEVEL 4
S = L1-7; LEVEL 4

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A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

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Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike Lee DATE 9-20-85

TYPE & NUMBER OF ANALYSIS	BLANK(S)	SPIKE(S)				DUPLICATE(S	
	CONCENTRATION	ORIGINAL CONC.	ADDED CONC.	FINAL CONC.	% REC.	1ST CONC.	2ND CONC.
Post & Herb 5							
Lindane	0	0	4.0	4.1	100	0	0
Endrin	0	0	9.6	9.9	103		
Methoxychlor	0	0	159	178	112		
2,4-D		0	140	149	106		
~~2,4,5-T~~ 2,4,5 T		0	13	17	130	0	0

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A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

SWL [illegible] LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike Lee DATE 9-23-24

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
4 waters 5 solvents BTX	0	0	4	4.2	105	0	0
						0	0

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

SWL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike Lee DATE 12-6-85

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
9 soil EP Tox						a	c
Lindane		0	4.0	4.0	99.2		
Endrin		c	9.6	9.5	98.7		
Toxaphene		c	5.2	5.2	101.1		
methoxy chlor		0	159	151	94.5		
2-4-D		^	140	148	105.0		
2,4,5-T		0	13	15.5	119.5		
2420 Level II							
LT-1 thru 9, Level 2							
LT-4 Level 3+4							
LT-7 Level 4							

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

OWL

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike Lee DATE 12-5-85

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
Phthalates							
						0	0
Dimethyl Phthalate		0	.04932	.017688	93.4		
Diethyl Phthalate		0	.016667	.01821	110.2%		
Di-N-Butyl Phthalate		0	.016667	.018417	109%		
Butyl Benzyl Phthalate		0	.01000	.010099	101%		
Dimethyl Hexyl Phthalate		0	.108333	.12158	112%		
Di-N-Octyl Phthalate		0	.1575	.17026	108%		
24210 Level II							
LT-1 thru 9, Level 2							
LI-4 Level 3 & 4							
LI-7 Level 4							

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APPROVED _____ DATE _____

SWL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike Lee DATE 12-9-85

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
VOL Solvents						0	0
DCM		0	.279	.257	92.5		
111 TCE		0	.276	.284	103		
TCE		0	.303	.306	101		
PCE		0	.3355	.352	104		
24210 Level #1							
LI-1 thru 9, Level 2							
LI-4 Level 3 & 4							
LI-7 Level 4							

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APPROVED _____ DATE _____

SWL

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike Lee DATE 12-9-85

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
EPA BTX AC 142.10 Level 1							
LE-1 Level 1							
LE-2, Level 2						0	0
Benzene #34		0	36.625	34.590	94		
Toluene #2		0	36.08	35.63	98		
Xylene #35		0	35.57	34.99	97.6		
LIH - Level 3 & 4							
LIH - Level 4							

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

SWL SOUTHWESTERN LABORATORIES, INC.

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

pes-TS HCl

NAME Mike Lee DATE 10-16 & 17

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
6 Pest + Herb FIX						0	0
Endrin		0	9.6	9.6	100		
Lindane		0	4.0	3.5	88		
methoxychlor		0	159	138	86.6		
2,4-D	0	0	140	110	78.5		
2,4,5-TP-Silvex	0	0	13	11	84.6		
Level LE 1 thru 6							
Level 1 of LE 1 thru 6							

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED_____ DATE_____

OWL

Construction materials testing, analytical chemistry and geotechnical engineering
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700

NAME Mike DATE 10-22-85

TYPE & NUMBER OF ANALYSIS	BLANK(S) CONCENTRATION	SPIKE(S) ORIGINAL CONC.	SPIKE(S) ADDED CONC.	SPIKE(S) FINAL CONC.	SPIKE(S) % REC.	DUPLICATE(S) 1ST CONC.	DUPLICATE(S) 2ND CONC.
4 PCB's							
	0	0	111.4	109.5	98.3	0	0
Level 1 LE 1 thru 6							
Level 4	LE 1 thru 6						

A BLANK IS AN ANALYSIS USING THE SAME REAGENTS AND METHOD WITH EITHER NO SAMPLE OR A SAMPLE WITH NO DETECTABLE CONCENTRATIONS OF ANALYTE.
A SPIKE IS AN ANALYSIS WHERE A KNOWN AMOUNT OF ANALYTE IS ADDED TO A SAMPLE WITH THE RATIO OF THE ADDED AMOUNT TO THE AMOUNT INCREASED X 100 GIVING THE % RECOVERY.
A DUPLICATE IS TWO COMPLETE ANALYSES OF THE SAME SAMPLE WHERE THE DEVIATION IS THE % VARIATION FROM THE MEAN.

APPROVED _____ DATE _____

SwL

SOUTHWESTERN LABORATORIES
Dallas Division

Materials, environmental and geotechnical consultation, fundamental testing and analytical services
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700 Metro 263-1133

CHAIN OF CUSTODY RECORD

				SAMPLERS (Signature)					
STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE: Water Comp.	Water Grab.	Air Sp:L	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
LI-1		12-4	8:00			✓		4	Call Bruce Baily
LI-2		12-4	8:00			✓		4	
LI-5		12-4	8:00			✓		4	
LI-6		12-4	8:00			✓		4	
LI-7		12-4	8:00			✓		4	
LI-8		12-4	8:00			✓		4	
LI-9		12-4	8:00			✓		4	

Relinquished by: (Signature) Robert L Sneed	Received by: (Signature) Susan Hadley	Date/Time 12/4 8:00 AM
Relinquished by: (Signature)	Relinquished by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Received by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) — Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

Distribution: Orig.–Accompany Shipment
1 Copy–Survey Coordinator Field Files

SwL

SOUTHWESTERN LABORATORIES
Dallas Division

Materials, environmental and geotechnical consultation, fundamental testing and analytical services
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700 Metro 263-1133

CHAIN OF CUSTODY RECORD

				SAMPLERS (Signature)					
STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE: Water Comp.	Water Grab.	Sludge/Solid Comp. Grab	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
LI-3		12-4	9:00AM			✓		4	Cadmium 1310/4
LI-4		12-4	10:00AM			✓		4	/

Relinquished by: (Signature)		Received by: (Signature)	Date/Time 12/4 1:25PM
Relinquished by: (Signature)		Relinquished by: (Signature)	Date/Time
Relinquished by: (Signature)		Received by: (Signature)	Date/Time
Received by: (Signature)		Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature)	Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:			

Distribution: Orig.–Accompany Shipment
1 Copy–Survey Coordinator Field Files

SwL

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Dallas Division

Materials, environmental and geotechnical consultation, fundamental testing and analytical services
P.O. Box 224227 • 2575 Lone Star Drive • Dallas, Texas 75264 • 214/631-2700 Metro 263-1133

CHAIN OF CUSTODY RECORD

				SAMPLERS (Signature)					
STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE: Water Comp.	SAMPLE TYPE: Water Grab.	SAMPLE TYPE: Air	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
1-12	Arlington, BMC	9/17/85	2:45					30	

Relinquished by: (Signature) Scott Smead	Received by: (Signature) Karen Mahmoud	Date/Time 9/17 18:40
Relinquished by: (Signature)	Relinquished by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Received by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) — Date/Time	Received for Laboratory by:	Date/Time
Method of Shipment:		

Distribution: Orig.–Accompany Shipment
1 Copy–Survey Coordinator Field Files

E. HAZARDOUS WASTE MANIFEST DOCUMENTS

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2000-0404. Expires 7-31-86

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. T·X·D008·0·1·8·004 Manifest Document No. 00667
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
General Motors Assembly Div.
2525 E. Abram., Arlington, Tx. 76010
4. Generator's Phone (817) 649 - 6353

A. State Manifest Document Number 00667 661
B. State Generator's ID 30347

5. Transporter 1 Company Name: Stravis
6. US EPA ID Number: LA·D006506923·9
C. State Transporter's ID
D. Transporter's Phone 504 642-8136

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address: Cecos/BFI 27004 S Frost Rd Livingston LA 70754
10. US EPA ID Number: LAD000618298 LA0000829
G. State Facility's ID
H. Facility's Phone 504 686-7252

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous Waste Sol.d N.O.S. ORM-E NA 9189	001	DT	~~20000~~	T	F005
b.			45740	P	
c.					

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under Section 3002(b) of RCRA, I also certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.

GENERATOR

Printed/Typed Name: Ken Mason — Signature: Ken Mason — Date: Month 10 Day 13 Year 85

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Duncan Roberson — Signature: Duncan Roberson — Date: Month 10 Day 13 Year 85

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Date: Month . Day . Year .

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: TERRY KAMDHANI — Signature — Date: Month 10 Day 13 Year 85

EPA Form 8700-22 (3-84) Original-DEQ, Green-Generator's 2nd, Yellow-Disposer, Pink-Transporter, Gold-Generator 1st

DEQ FORM HW-3 (R 9/84)

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
HAZARDOUS WASTE DIVISION
P.O. BOX 44307
BATON ROUGE, LOUISIANA 70804

Please print or type (Form designed for use on elite (12-pitch) typewriter)

Form Approved OMB No 2000-0404 Expires 7-31-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. T X D 0 0 8 0 1 8 0 0 4 — Manifest Document No. 00675
2. Page 1 of — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
General Motors, CPC Group
2525 E. Abram,
Arlington, Texas 76010
4. Generator's Phone (817) 649-6350

A. State Manifest Document Number: 00675
B. State Generator's ID: 30367

5. Transporter 1 Company Name: Chemical Waste Management
6. US EPA ID Number: T X D 9 8 0 7 4 4 4 8 6
C. State Transporter's ID: 37081
D. Transporter's Phone: 713-527-6772

7. Transporter 2 Company Name:
8. US EPA ID Number:
E. State Transporter's ID:
F. Transporter's Phone:

9. Designated Facility Name and Site Address
Chemical Waste Management, Inc.
Route 2, John Brannon Road
Carlyss, Louisiana 70663
10. US EPA ID Number: L A D 0 0 0 7 7 7 2 0 1
G. State Facility's ID: 70022
H. Facility's Phone: (318) 583-2169

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous Waste Solid N.O.S. ORM-E NA9189	0 0 1	C M	Est. 27,000 Y		941710
b.			00017		D A E F
c.					

J. Additional Descriptions for Materials Listed Above: Profile No. LCH E-08555
K. Handling Codes for Wastes Listed Above:

15. Special Handling Instructions and Additional Information
If spilled in Louisiana, contact LDPS Haz. Mat. Unit (504) 925-6595 and Generator, Kent Moon, home (214) 223-9190; office (817) 649-6350.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under Section 3002(b) of RCRA, I also certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.

Printed/Typed Name: KENT — Signature: Kent Moon — Date: Month 1 Day 10 Year 85

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: ROBERT HARRIS — Signature: Robert Harris — Date: Month 1 Day 10 Year 85

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: — Signature: — Date: Month FB Day . Year .

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: [illegible] — Signature: [illegible] — Date: Month 1 1 Day 05 Year 85

EPA Form 8700-22 (3-84) Original-DEQ, Green-Generator's 2nd, Yellow-Shipper, Pink-Transporter, Gold-Generator 1st

DEQ FORM HW-3 (R 9/84)

TEXAS DEPARTMENT OF WATER RESOURCES
P.O. Box 13087, Capitol Station
Austin, Texas 78711

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form approved. OMB No. 2000-0404. Expires 7-31-86

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. T X 3 8 8 8 8 1 2 6 0 4 — Manifest Document No.

2. Page 1 of — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
General Motors, CPC Group
2525 E. Abram,
Arlington, Texas 76010 817 649-6350

4. Generator's Phone ( )

A. State Manifest Document Number 00154318

B. State Generator's ID 30347

5. Transporter 1 Company Name: Waste Processors Inc.

6. US EPA ID Number: T X D 0 5 0 6 4 1 4 6 3

C. State Transporter's ID 60369

D. Transporter's Phone 713 [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Rollins Environmental Services
P.O. Box 609, 2027 Battleground Rd.
Deer Park, TX 77536

10. US EPA ID Number: T X D 0 5 5 1 4 1 3 7 8

G. State Facility's ID 01429

H. Facility's Phone 713 479-600[illegible]

11A. HM	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
/	a. Hazardous Waste Solid N.O.S. ORM-E NA9189	0 0.	D-T	22	Y	950310
	b.					
	c.					
	d.					

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
If spilled, contact Generator, Kent Moon, home (214) 223-9190; office (817) 649-6350.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations, including applicable state regulations.

Printed/Typed Name: K. Moon — Signature: K. Moon — Date: Month . Day . Year .

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: [illegible] — Signature: [illegible] — Date: Month . Day . Year .

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Date: Month . Day . Year .

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Date: Month . Day . Year .

EPA Form 8700-22 (3-84) White - original Pink-TSD Facility Yellow-Transporter Green-Generator's first copy
TDWR-0311

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: John Wankum Utility Engineer, Water Department, City of Arlington, TX (817) 275-5931	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/24/89 Time: 1:40 PM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

His utility serves drinking water to the entire area within four miles of the site except for that portion supplied by the City of Grand Praire Water Department. He will send me a map of his service area near the site.

Arlington obtains their water supply from:

1) Cedar Creek Reservoir

2) Richland Chambers Reservoir

3) Village Creek Watershed

4) One well aproximately 5 to 6 miles south of the site

He doesn't know if anyone has their own drinking water wells with 4 miles of site.

Arlington serves approximately 70,000 connections.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Wilburn White Utility Supervisor, Water Department City of Grand Prairie, TX (214) 660-8164	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/24/89 Time: 3:30 PM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

Within 4 miles of the site, the Grand Prairie Water Department serves drinking water to those areas not served by Arlington. There are no other utilities serving the area and he does not know of any domestic drinking water wells. The two utilities border approximately 1 mile east of Highway 360.

His utility serves approximately 28,000 connections. The service network is completely interconnected. They buy water from Fort Worth (10% of supply) and Dallas (40% of supply). Grand Prairie has 11 drinking water wells providing 50% of the supply. The nearest wells are 5 miles due east of the site and 5 miles southeast of the site.

He drives near the site on a regular basis and knows of no agricultural land (cropland) within 4 miles of the site.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION (817) 334-2961	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Joe Johnston, Biologist Ecological Services, United States Fish & Wildlife Service Fort Worth, Texas	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89 Time: 11:30 AM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

There are no critical habitats for federally listed endangered species within 4 mmiles of the site.

There may be sensitive environments within 4 miles of the site. I would have to send him a copy of my map with the 4 mile radius and he will check his maps for sensitive environment designations.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Eddy Mack Engineering Assistant, Texas Air Control Board Region 8, Fort Worth, Texas (817) 732-5531	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/24/89 Time: 2:30 PM
SUBJECT: G. M. Assembly - PA (TXD008018004)		
SUMMARY OF COMMUNICATION		
There are about 8 to 12 air permits for this site. The permits relate		
to an area or activity (auto painting, final repair painting, incinerator,		
etc.).		
He has been to the site and is familiar with the facility for the last		
two years. He is not aware of any major problem at the facility. There		
was a situation where primer surfacer (chemical used to help bond primer		
paint to metal surfaces) was over the required limit, but was below required		
limits when retested.		
CONCLUSIONS, ACTION TAKEN OR REQUIRED		
INFORMATION COPIES TO:		

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Wilma Stevenson Administrative Technician, Information and Technical Services Texas Water Commission Austin, Texas (512) 463-8174	From: Raymond Wayne RW, FIT Hydrologist	Date: 5/5/89 Time: 1:20 PM
SUBJECT: G. M. Assembly - PA (TXD008018004)		
SUMMARY OF COMMUNICATION		
RCRA Part B Application requested 5/15/84.		
Part B not submitted because the drum storage area and surface impoundment		
were closed.		
Part A Application withdrawn by G.M. on 6/18/87.		
CONCLUSIONS, ACTION TAKEN OR REQUIRED		
INFORMATION COPIES TO:		

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION (817) 334-4685	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Sid Ricks Conservation Officer, United States Soil Conservation Service, Fort Worth, Texas	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89 Time: 1:15 PM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

The area within 4 miles of the site is highly urbanized. They last worked near the site in 1979.

The agricultural land within 4 miles of the site is pasture, hay producing and graze land. There are no crops used for direct human consumption grown within 4 miles of the site.

Water for the agricultural land comes from rainfall. The land is not usually irrigated.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION (817) 459-5900	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify) 1 of 2	
TO: Craig Powell, Senior Pollution Control Officer Water Dept. City of Arlington, TX	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/15/89 Time: 3:00 PM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

He worked in his department for 10 years and is familiar with G.M.

G.M. has a written permit to discharge treated wastewater into the Arlington sanitary sewer system. The permit specifies water quantity and quality standards. The permit process began in 1972 (Clean Water Act). G. M. received a permit at that time. Since 1972, the permit requirements have been tightened. G. M. has been in compliance with permit standards ("they have a very good record"). If minor problems were identified, they were corrected.

Process liquids, and surface water runoff from process areas, flow into the treatment system at G. M. and into the sanitary sewer system. G. M. has an effective surface water runoff containment system for its hazardous waste areas. Surface water runoff from non-process areas flow into the storm sewer system. "Any hazardous waste getting into the storm sewer system would be the result of an accidental spill, and not routine facility operations".

The storm sewer system is overseen by the Arlington Health Department.

Steve Rothwell (817/459-5900, Ext. 7063) investigated the recent fuel oil spill to the storm sewer system at the site.

Storm water from G. M. enters the sewer system, is mixed with storm water from other sources (including industrial facilities), and flows north to

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify) 2 of 2	
TO: Craig Powell (817) 459-5900 (Continued)	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89 Time: 3:00 PM

SUBJECT: G. M. Assembly - FA (TXD008018004)

SUMMARY OF COMMUNICATION

a lake at Six Flags Park. The conduit is mostly an open, concrete-lined ditch. The lake discharges (overflow spillway) into Johnson Creek.

G. M. is storing contaminated ground water (from the oil spill) on-site and proposes to process it in its wastewater treatment facility for eventual discharge to the Arlington sanitary sewer system.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref 19 ; 30347

TEXAS WATER COMMISSION

Paul Cooper

June 18, 1987

Mr. D.W. Tunstall
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010

Re: ~~General Motors Corp.~~
Application No. 10411
Registration No. 30347
U.S. EPA I.D. No. TXD008018004

Dear Mr. Tunstall:

We have reviewed Part A - Facility Background Information for the above referenced site and also the Affidavit of Exclusion which was submitted for the purpose of withdrawing the hazardous waste permit application from further consideration in accordance with the exclusion claimed.

Based on our review of Part A and the Affidavit of Exclusion, the application for a hazardous waste permit has been withdrawn. We are retaining certain portions of the Part A for incorporation into your solid waste registration file.

Should you have any questions regarding this matter, please do not hesitate to contact Ms. Wilma Varner of my staff at 512/463-7764.

Sincerely,

for

Russell S. Kimble, Chief
Reports and Management Section
Hazardous and Solid Waste Division

WV:ok

Ref 20 - in w co. file

Chevrolet-Pontiac-Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

December 15, 1986

Texas Water Commission, District 4
203 James Collins Blvd.
Duncanville, Tx 75116-4818

Good Day,

An accidental discharge of paint thinner from our facility was reported to you Friday morning, December 5, 1986. This letter is simply to confirm and document the information which was provided to you at that time.

Approximately 1500 gallons of virgin paint thinner, consisting of xylene, toluene and methyl ethyl ketone, was accidentally discharged between 5:00 and 5:30 am through an open valve located in our Paint Mix Building into an excavation approximately 10-15 foot west of Paint Mix. This excavation was about 5 foot deep and was dug in preparation for the construction of a road bed. The Paint Mix Building is detached from the assembly plant, and is located to the west of the assembly building. No injuries were incurred as a result of this incident.

250 - 350 gallons of the thinner was vacuumed out of the pit or collected from the floor of the Paint Mix Building. Around 21 cubic yards of soil was removed from the excavation and will be disposed of as hazardous waste. An unknown portion of the thinner was carried by a trade waste line through a primary treatment plant, the grit separator, and into the Waste Water Treatment Plant where it was contained.

The Texas Water Commission, as well as the National Response Center, were notified the morning of December 5. TWC visited the site around 11:00 the same day.

Please feel free to refer any questions concerning this incident to:

JoAnne M. Pritchard
CPC Arlington - General Motors Corp.
Safety Department
2525 E.Abram
Arlington, TX 76011
817-649-6277-8

J. D. Douglas

Ron Lee
For Personnel Director

cc: National Response Center
G.Giles, Production Manager
R.Murday, Plant Engineer

Ref. 21 RC

Chevrolet-Pontiac-Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

April 8, 1989

certified mail, return receipt

Texas Water Commission, District 4
203 James Collins Blvd.
Duncanville, TX 75116-4818

Good Day,

This letter is to confirm and document the information that was provided to you by telephone on April 4, 1989 regarding an accidental discharge of #2 fuel oil at the General Motors CPC Arlington Plant in Arlington, Texas. This incident was initially reported to your officer, Mr. Richard Clark on April 4, 1989 at approximately 12:25pm.

We were notified by city water officials at approximately 10:00am on April 4, 1989 that oil was reported in storm sewers by TDC Corporation, located approximately 1 mile north of our property line. Our preliminary investigation identified the source as the storm sewers at the north end of our property. We immediately initiated containment and clean-up operations off-site and on-site through our own efforts and those of our contractors.

Our investigation reveals at this time that the source of the incident is an underground #2 fuel oil storage tank farm consisting of 6-48,000 gallon tanks used for emergency heating fuel. The preliminary assessment indicates that the condition may have occurred due to mechanical failures resulting in a tank overfill situation with an estimated release on-site in the 15,000 - 40,000 gallon range. Some of the materials seeped with ground water into an on-site storm drain leading to an interceptor station. From this interceptor it is estimated that approximately 100 gallons exited the property through a storm drain.

The on-site storm drain and all off-site cleaning efforts are nearing completion. Daily reviews of the off-site areas and appropriate actions as needed will continue for a minimum of two weeks. As a precaution, all soil, foliage, absorbent materials, contaminated water/fuel etc. recovered from these areas is being disposed of as hazardous waste. Containment measures including trenching and sump wells have

been implemented at the tank farm. Two wells drilled on the tank farm are yielding fuel and water. This is being fractioned on-site. The fuel is being retained for future use and the water treated in our waste water treatment plant.

In addition to our notification of TWC, the National Response Center (Petty Officer Sandahl, Report #4852, 12:00 pm April 4, 1989) the EPA (Mr. Charles Gazda, 12:11 pm April 4, 1989) and the Arlington Local Emergency Planning Committee (Mr. Douglas Penlen, 10:40 am April 5, 1989) were notified. We are investigating ways to ensure that this incident does not reoccur.

Please feel free to refer any questions concerning this incident to:

JoAnne M. Pritchard
CPC Arlington - General Motors Corporation
2525 E. Abram Street
Arlington, Texas 76010
817-652-2376

Robert Murday by JMP

Robert Murday
Plant Engineer

cc: National Response Center
Mr. Jack Mathews, Arlington LEPC
Environmental Protection Agency, Region 6

Ref. 22

Dangerous Properties of Industrial Materials

Seventh Edition

Volume II

N. IRVING SAX

and

RICHARD J. LEWIS, SR.

VAN NOSTRAND REINHOLD
NEW YORK

BAG500 *HR: 3*
BARBITURATES

SYNS:
BARBITAL
BARBITAL SODIUM
BARBITONE
DERIVATIVES OF BARBITURIC ACID, I.E.

THR: Salts or derivatives of barbituric acid. They are central nervous system depressants and are used as hypnotics, sedatives and anesthetics. Usually administered orally. They are strongly habit forming. Several compounds including amo-, seco-, and pentabarbital are restricted chemicals. Their use can cause a reaction called barbiturism which is marked by chills, headache, fever, and cutaneous eruptions. See BARBITAL SODIUM.

BAG750 *HR: 1*
BARBITURIC ACID
mf: $C_4H_4O_3N_2$ mw: 128.1

PROP: Crystals or white to yellow-white powder, mp: 245°, bp: 260° (decomp).
THR: Mildly toxic. Irritating to skin, eyes and mucous membranes. An allergen. Has no hypnotic properties. Combustible.

BAH250 *HR: 3*
BARIUM
CAS: 7440-39-3 NIOSH: CA 8370000
DOT: 1399/1400/1854
af: Ba aw: 137.36

PROP: Silver-white, sltly lustrous, somewhat malleable metal. Mp: 725°, bp: 1640°, d: 3.5 @ 20°, vap press: 10 mm @ 1049°.

Reported in EPA TSCA Inventory. Community Right To Know List.

ACGIH TLV: TWA 0.5 mg/m^3
DFG MAK: 0.5 mg/m^3

DOT Classification: Some barium compounds are flammable or explosive

THR: See BARIUM COMPOUNDS. Water and stomach acids solubilize barium salts and can cause poisoning. Symptoms are vomiting, colic, diarrhea, slow irregular pulse, transient hypertension, and convulsive tremors and muscular paralysis. Death may occur from a few hours to a few days. Half-life of barium in bone has been estimated at 50 days. Dust is dangerous and explosive when exposed to heat, flame, or chemical reaction. Violent or explosive reaction with water; CCl_4; fluorotrichloromethane; trichloroethylene; and C_2Cl_4. Incompatible with acids; $C_2Cl_3F_3$; $C_2H_2FCl_3$; C_2HCl_3 and water; 1,1,2-trichloro trifluoro ethane; and fluorotrichloroethane. The powder may ignite or explode in air or other oxidizing gases. For further information, see Vol. 3, No. 4 of *DPIM Report*.

BAH500 *HR: 3*
BARIUM ACETATE
CAS: 543-80-6 NIOSH: AF 4550000
mf: $C_4H_6O_4 \cdot Ba$ mw: 255.44

PROP: White crystals. Water-sol.

SYNS:
ACETIC ACID, BARIUM SALT
BARIUM DIACETATE
OCTAN BARNATY (CZECH)

TOXICITY DATA:
orl-rat LD50:921 mg/kg
ivn-mus LD50:11 mg/kg
orl-rbt LDLo:236 mg/kg
scu-rbt LDLo:96 mg/kg
ivn-rbt LDLo:12 mg/kg

CODEN:
MarJV# 29MAR77
TXAPA9 22,150,72
EQSSDX 1,1,75
EQSSDX 1,1,75
EQSSDX 1,1,75

Reported in EPA TSCA Inventory. Barium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 500 ppm
ACGIH TLV: TWA 0.5 mg(Ba)/m^3

THR: Poison via ingestion, intravenous and subcutaneous routes. When heated to decomposition it emits acrid smoke and fumes. See also BARIUM COMPOUNDS.

BAH750 *HR: 3*
BARIUM ACETYLIDE
CAS: 12070-27-8
mf: C_2Ba mw: 161.35

Barium and its compounds are on the Community Right To Know List.

Ignites on contact with vapors of water or ethanol in air. Incandescent reaction when heated with: hydrogen @ 150°C; chlorine @ 140°C; bromine @ 130°C; iodine @ 122°C; and selenium @ 150°C. See also BARIUM COMPOUNDS and ACETYLIDES.

BAI000 *HR: 3*
BARIUM AZIDE
CAS: 18810-58-7 NIOSH: CQ 8500000
DOT: 0224
mf: BaN_6 mw: 221.40

PROP: Monoclinic prisms. Mp: $-N_2$ @ about 120°, bp: explodes, d: 2.936.

SYN: BARIUM AZIDE, dry or containing less than 50% water (DOT)

Reported in EPA TSCA Inventory. Barium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 0.5 mg(Ba)/m^3
ACGIH TLV: TWA 0.5 mg/(Ba)m^3

DOT Classification: Class A Explosive; Label: Explosive A and Poison

SYNS:
6-(3-(2-CHLORO-6-FLUOROPHENYL)-5-METHYL-4-ISOXAZOLECARBOXAMIDO)PENICILLANIC ACID SODIUM SALT
CULPEN
FLOXACILLIN SODIUM MONOHYDRATE
FLOXAPEN
FLUCLOXACILLIN SODIUM MONOHYDRATE
STAPHYLEX

TOXICITY DATA:	CODEN:
orl-mus LD50:3800 mg/kg	MEIEDD 10,589,83
scu-mus LD50:2200 mg/kg	MEIEDD 10,589,83

THR: Moderately toxic by ingestion and subcutaneous routes. When heated to decomposition it emits very toxic fumes of Cl^-, F^-, NO_x, Na_2O and SO_x. See other penilillin entries.

CHJ250 *HR: 3*

3-CHLORO-2-FLUOROPROPENE

CAS: 6186-91-0 NIOSH: UC 7700000
mf: C_3H_4ClF mw: 94.52

SYN: 3-CHLORO-2-FLUORO-1-PROPENE

TOXICITY DATA:	CODEN:
orl-rat LD50:280 mg/kg	AIHAAP 23,95,62
ihl-rat LCLo:1000 ppm/4H	AIHAAP 23,95,62
skn-rbt LD50:200 mg/kg	AIHAAP 23,95,62

THR: Poison by ingestion and skin contact. Mildly toxic by inhalation. When heated to decomposition it emits very toxic fumes of F^- and Cl^-. See also CHLORINATED HYDROCARBONS, ALIPHATIC; and FLUORIDES.

CHJ500 *HR: 3*

CHLOROFORM

CAS: 67-66-3 NIOSH: FS 9100000
DOT: 1888
mf: $CHCl_3$ mw: 119.37

PROP: Colorless liquid; heavy, ethereal odor. Mp: −63.5°, bp: 61.26°, fp: −63.5°, flash p: none, d: 1.49845 @ 15°, vap press: 100 mm @ 10.4°, vap d: 4.12.

SYNS:
CHLOROFORME (FRENCH)
CLOROFORMIO (ITALIAN)
FORMYL TRICHLORIDE
METHANE TRICHLORIDE
METHENYL TRICHLORIDE
METHYL TRICHLORIDE
NCI-C02686
R 20 (REFRIGERANT)
RCRA WASTE NUMBER U044
TCM
TRICHLOORMETHAAN (DUTCH)
TRICHLORMETHAN (CZECH)
TRICHLOROFORM
TRICHLOROMETHANE
TRICLOROMETANO (ITALIAN)

TOXICITY DATA:	CODEN:
skn-rbt 10 mg/24H open MLD	AIHAAP 23,95,62
skn-rbt 500 mg/24H MLD	28ZPAK -,27,72
eye-rbt 148 mg	AIHAAP 37,697,76
eye-rbt 20 mg/24H MOD	28ZPAK -,27,72
oms-grh-ihl 562 mg/L	MUREAV 113,467,83
sce-hmn:lym 10 mmol/L	ENVRAL 32,72,83
dnd-rat-orl 1 µmol/kg	CBINA8 33,301,81
dns-mus-ipr 50 mg/kg	TOLED5 21,357,84
sce-mus-orl 200 mg/kg/4D-I	ENVRAL 32,72,83
dnd-mam:lym 1 mmol/L	TOLED5 11,243,82
orl-rat TDLo:1260 mg/kg (6-15D preg):TER	TXAPA9 29,348,74
ihl-rat TCLo:30 ppm/7H (6-15D preg):TER	TXAPA9 28,442,74
orl-mus TDLo:2115 mg/kg (3W male/3W pre-5D post):REP	EVHPAZ 46,127,82
orl-rat TDLo:13832 mg/kg/2Y-C:CAR	FAATDF 5,760,85
orl-mus TDLo:127 gm/kg/92W-I:CAR	NCITR* NCI-CG-TR-0,76
orl-rat TD :98 gm/kg/78W-I:NEO	NCITR* NCI-CG-TR-0,76
orl-mus TD :18 gm/kg/17W-I:NEO	JNCIAM 5,251,45
orl-rat TD :7020 mg/kg/78W-I:CAR	EVHPAZ 31,171,79
orl-rat TD :70 gm/kg/78W-I:NEO	NCITR* NCI-CG-TR-0,76
orl-mus TD :24752 mg/kg/2Y-C:ETA	FAATDF 5,760,85
orl-rat TD :58968 mg/kg/2Y-C:NEO	FAATDF 5,760,85
ihl-hmn TCLo:10 mg/m³/1Y:CNS,GIT	IRGGAJ 24,127,67
ihl-hmn TCLo:5000 mg/m³/7M:CNS	AHBAAM 116,131,36
ihl-hmn LCLo:25000 ppm/5M	TABIA2 3,231,33
orl-hmn LDLo:140 mg/kg	32ZWAA 8,275,74
unr-man LDLo:546 mg/kg	85DCAI 2,73,70
orl-rat LD50:908 mg/kg	JPFCD2 17,205,82
ihl-rat LCLo:8000 ppm/4H	AIHAAP 23,95,62
orl-mus LD50:36 mg/kg	ATSUDG 2,371,79
ihl-mus LC50:28 g/m³	PCOC** -,230,66
ipr-mus LD50:1484 mg/kg	TXAPA9 45,861,78
scu-mus LD50:704 mg/kg	JPETAB 123,224,58
orl-dog LDLo:1000 mg/kg	QJPPAL 7,205,34
ihl-dog LC50:100 g/m³	PCOC** -,230,66
ipr-dog LD50:1000 mg/kg	TXAPA9 10,119,67
ivn-dog LDLo:75 mg/kg	QJPPAL 7,205,34
ihl-cat LCLo:35000 mg/m³/4H	AHBAAM 116,131,36
orl-rbt LDLo:500 mg/kg	AEXPBL 97,86,23
ihl-rbt LC50:59 gm/m³	PCOC** -,230,66
scu-rbt LDLo:800 mg/kg	QJPPAL 7,205,34
orl-gpg LD50:820 mg/kg	GISAAA 48(3),10,83
ihl-gpg LCLo:20000 ppm/2H	FLCRAP 1,197,67
ihl-frg LCLo:6000 mg/m³	AEXPBL 97,86,23
ihl-mam LCLo:25000 ppm/5M	AEPPAE 138,65,28

IARC Cancer Review: Animal Limited Evidence IMEMDT 1,61,72; Human Limited Evidence IMEMDT 20,401,79; Animal Sufficient Evidence IMEMDT 20,401,79; NCI Carcinogenesis Bioassay (gavage); Clear Evidence: mouse, rat NCITR* NCI-CG-TR,1976. Reported in EPA TSCA Inventory. EPA Genetic Toxicology Program. EPA Extremely Hazardous Substances List. Community Right To Know List.

OSHA PEL: CL 50 ppm
ACGIH TLV: TWA 10 ppm; Suspected Carcinogen
DFG MAK: 10 ppm (50 mg/m³)
NIOSH REL: (Waste Anesthetic Gases and Vapors) CL 2 ppm/1H; (Chloroform) CL 2 ppm/60M

DOT Classification: ORM-A; Label: None; IMO: Poison B, Label: Poison

THR: A human poison by ingestion and inhalation. An experimental poison by ingestion and intravenous routes. Moderately toxic experimentally by intraperitoneal and subcutaneous routes. A suspected human carcinogen. An experimental carcinogen, neoplastigen, tumorigen and teratogen. Human systemic effects by inhalation: hallucinations and distorted perceptions, nausea, vomiting, and other unspecified gastrointestinal effects. Human mutagenic data.

Inhalation of the concentrated vapor causes dilation of the pupils with reduced reaction to light, as well as reduced intraocular pressure (experimental). In the initial stages there is a feeling of warmth of the face and body, then an irritation of the mucous membranes, conjunctiva, and skin; followed by excitation, loss of reflexes, sensation, and consciousness. Prolonged inhalation will bring on paralysis accompanied by cardiac respiratory failure and finally death.

Chloroform has been widely used as an anesthetic. However, due to its toxic effects, this use is being abandoned. Concentrations of 68,000-82,000 ppm in air can kill most animals in a few minutes. 14,000 ppm may cause death after an exposure of from 30 to 60 minutes. 5,000-6,000 ppm can be tolerated by animals for 1 hour without serious disturbances. The maximum concentration tolerated for several hours or for prolonged exposure with slight symptoms is 2,000-2,500 ppm. Prolonged administration as an anesthetic may lead to such serious effects as profound toxemia and damage to the liver, heart and kidneys. Experimental prolonged but light anesthesia in dogs produces a typical hepatitis.

Explosive reaction with sodium + methanol; sodium methoxide + methanol. Mixtures with sodium or potassium are impact sensitive explosives. Reacts violently with acetone + alkali (e.g., sodium hydroxide; potassium hydroxide; or calcium hydroxide); Al; disilane; Li; Mg; methanol + alkali; nitrogen tetroxide; perchloric acid + phosphorus pentoxide; potassium-tert-butoxide; sodium methylate; NaK. Incompatible with dinitrogen tetraoxide; fluorine; metals; triisopropylphosphine. Combustible when exposed to high heat. When heated to decomposition it emits toxic fumes of Cl^-.

See also CHLORINATED HYDROCARBONS, ALIPHATIC. For further information, see Vol. 3, No. 5 of *DPIM Report*.

CHJ599 HR: 3

CHLOROFORMAMIDINIUM CHLORIDE

CAS: 29671-92-9

mf: CH_4Cl2N_2 mw: 102.95

$ClC(:NH)N+H_3Cl^-$

THR: Reaction with perchloric acid forms highly explosive products. When heated to decomposition it emits toxic fumes of Cl^- and NO_x. See also CHLORIDES.

CHJ625 HR: 3

CHLOROFORMAMIDINIUM NITRATE

CAS: 75524-40-2

mf: $CH_3ClN_3O_3$ mw: 140.51

THR: A powerful explosive and a strong oxidant. Mixtures with wet magnesium powder; powdered aluminum; or powdered iron ignite and then explode. Reacts violently with ammonia or amines. When heated to decomposition it emits toxic fumes of Cl^- and NO_x. See also NITRATES and EXPLOSIVES.

CHJ750 HR: 3

4-CHLORO-N-FURFURYL-5-SULFAMOYLANTHRANILIC ACID

CAS: 54-31-9 NIOSH: CB 2625000

mf: $C_{12}H_{11}ClN_2O_5S$ mw: 330.76

SYNS:

AISEMIDE
ALUZINE
5-(AMINOSULFONYL)-4-CHLORO-2-((2-FURNAYLMETHYL) AMINO)BENZOIC ACID
BERONALD
CHLOR-N-(2-FURYLMETHYL)-5-SULFAMYLANTHRANILSAEURE (GERMAN)
4-CHLORO-N-(2-FURYLMETHYL)-5-SULFAMOYLANTHRANILIC ACID
DESDEMIN
DIURAL
DRYPTAL
ERROLON
EUTENSIN
FRUSEMIDE
FRUSEMIN
FRUSID
FULSIX
FULUVAMIDE
FURANTHRIL
FURANTHRYL
FURANTRIL
FURESIS
FUROSEDON
FUROSEMID
FUROSEMIDE
FUROSEMIDE "MITA"
FURSEMID
FURSEMIDE
FUSID
HYDRO-RAPID
KATLEX
LASEX
LASIX
LB 502
LOWPSTRON
MACASIROOL
NICOROL
NCI-C55936
PREFEMIN
PROFEMIN
RADONNA
ROSEMIDE
SALIX
SEGURIL
TRANSIT
TROFURIT
UREX
UROSEMIDE

TOXICITY DATA:

cyt-mus-ipr 312 µg/kg
cyt-hmn:leu 200 mg/L/24H
cyt-ham:lng 1 g/L
cyt-ham:fbr 2 g/L
orl-rat TDLo:150 mg/kg (12-14D preg):TER
orl-mus TDLo:12500 mg/kg (6-15D preg):TER
ivn-man TDLo:29 mg/kg: EAR,KID
ivn-hmn TDLo:1300 µg/kg:CVS

CODEN:

IJMRAQ 66,104,77
MUREAV 66,69,79
ATSUDG (4),41,80
ESKHA5 96,55,78
TJADAB 31,401,85
SEIJBO 24,111,84
NEJMAG 282,1413,70
AIMEAS 103,1,85

THR: An experimental carcinogen and neoplastigen. Very powerful oxidizer. See also CHROMIUM COMPOUNDS.

CMI500 ***HR: 3***

CHROMITE (MINERAL)

CAS: 1308-31-2 NIOSH: GB 4000000

mf: Cr_2FeO_4 mw: 223.85

SYNS:

CHROME ORE
CHROMITE
CHROMITE ORE
IRON CHROMITE

TOXICITY DATA:	CODEN:
mma-sat 2 mg/plate	CRNGDP 3,1331,82
cyt-hmn:oth 500 mg/L	BJCAAI 44,219,81
dni-ham:kdy 500 mg/L	BJCAAI 44,219,81
oms-ham:kdy 500 mg/L	BJCAAI 44,219,81
cyt-ham:ovr 5 mg/L	BJCAAI 44,219,81
sce-ham:ovr 10 mg/L	CRNGDP 3,1331,82

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,205,80. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.5 mg(Cr)/m^3

ACGIH TLV: TWA 0.05 mg/m^3 (ore processing); Human Carcinogen (ore processing)

THR: A human carcinogen. Human mutagenic data. See also CHROMIUM COMPOUNDS and IRON.

CMI750 ***HR: 3***

CHROMIUM

CAS: 7440-47-3 NIOSH: GB 4200000

mf: Cr mw: 52.00

SYN: CHROME

TOXICITY DATA:	CODEN:
ivn-rat TDLo:2160 µg/kg/6W-I: ETA	JNCIAM 16,447,55
imp-rat TDLo:1200 µg/kg/6W-I: ETA	JNCIAM 16,447,55
imp-rbt TDLo:75 mg/kg:ETA	ZEKBAI 52,425,42
orl-hmn LDLo:71 mg/kg:GIT	34ZIAG -,176,69

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,205,80. Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 1 mg/m^3

ACGIH TLV: TWA 0.5 mg/m^3

THR: Human poison by ingestion with gastrointestinal effects. An experimental tumorigen and suspected carcinogen. Powder will explode spontaneously in air. Ignites and is potentially explosive in atmospheres of carbon dioxide. Violent or explosive reaction when heated with ammonium nitrate. May ignite or react violently with bromine pentafluoride. Incandescent reaction with nitrogen oxide; sulfur dioxide. Incompatible with oxidants. See also CHROMIUM COMPOUNDS. For further information, see Vol. 3, No. 3 of *DPIM Report*.

CMJ000 ***HR: 3***

CHROMIUM ACETATE HYDRATE

CAS: 628-52-4 NIOSH: AG 3000000

mf: $C_4H_6O_4 \cdot Cr \cdot H_2O$ mw: 188.12

PROP: Red crystals.

SYNS:

ACETIC ACID, CHROMIUM (2+) SALT (8CI, 9CI)
CHROMIUM(2+) ACETATE
CHROMIUM(II) ACETATE
CHROMIUM DIACETATE
CHROMOUS ACETATE
CHROMOUS ACETATE MONOHYDRATE

TOXICITY DATA:	CODEN:
orl-rat LD50:11260 mg/kg	AIHAAP 30,470,69

Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.5 mg(Cr)/m^3

ACGIH TLV: TWA 0.5 mg(Cr)/m^3

THR: Mildly toxic by ingestion. The anhydrous acetate ignites spontaneously in air. See also CHROMIUM COMPOUNDS. When heated to decomposition it emits acrid smoke and irritating fumes.

CMJ250 ***HR: 3***

CHROMIUM CHLORIDE

CAS: 10025-73-7 NIOSH: GB 5425000

mf: Cl_3Cr mw: 158.35

PROP: Bp: 1300° (subl).

SYNS:

CHROMIC CHLORIDE
CHROMIUM(III) CHLORIDE (1:3)
CHROMIUM CHLORIDE, ANHYDROUS
CHROMIUM TRICHLORIDE
C.I. 77295
PURATRONIC CHROMIUM CHLORIDE
TRICHLOROCHROMIUM

TOXICITY DATA:	CODEN:
pic-esc 500 µmol/L	ENMDUM 6,59,84
cyt-hmn:oth 500 mg/L	BJCAAI 44,219,81
dnd-rat-ipr 80 mg/kg	CNREA8 45,1146,85
dni-mus:fbr 300 µmol/L	JTEHD6 15,237,85
sce-ham:lng 39 mg/L	CRNGDP 4,605,83
ipr-mus TDLo:44600 µg/kg (8D preg):TER	JTSCDR 1,1,76
ipr-mus TDLo:59500 µg/kg (9D preg):REP	JTSCDR 1,1,76
scu-mus TDLo:450 mg/kg (1-17D preg):TER	TJADAB 12,198,75
skn-rat LDLo:2 g/kg	85GMAT -,39,82
ihl-mus LC50:31500 µg/m^3/2H	85GMAT -,39,82
ipr-mus LD50:434 mg/kg	COREAF 256,1043,63
scu-mus LDLo:800 mg/kg	AQMOAC #70-15,70
ivn-mus LDLo:400 mg/kg	AQMOAC #70-15,70
ivn-mus LD50:40 mg/kg	85GMAT -,39,82
skn-rbt LDLo:1 g/kg	85GMAT -,39,82

OSHA PEL: TWA 0.2 mg/m^3
NIOSH REL: (To Coal Tar Products) TWA 0.1 mg/m^3

DOT Classification: Flammable or Combustible; Label Flammable Liquid

THR: An experimental carcinogen and tumorigen. Mutagenic data. A human and experimental skin irritant. When heated to decomposition it emits acrid smoke and irritating fumes.

LCC000 *HR: 1*
LAVENDER ABSOLUTE
CAS: 8000-28-0 NIOSH: OF 6100000

PROP: Found in the flowers of *Lavandula officinalis chaix.* The main constituent is linalyl acetate. A dark green liquid prepared from alcoholic extract of a residue which is extracted from plant material using an organic solvent.

TOXICITY DATA:	CODEN:
skn-rbt 500 mg/24H MLD	FCTXAV 14,449,76
orl-rat LD50:4250 mg/kg	FCTXAV 14,449,76

THR: Mildly toxic by ingestion. A skin irritant. When heated to decomposition it emits acrid smoke and irritating fumes. See also 3,7-DIMETHYL-1,6-OCTADIEN-3-OL ACETATE.

LCD000 *HR: 1*
LAVENDER OIL
CAS: 8000-28-0 NIOSH: OF 6110000

PROP: Main constituent is linalyl acetate. Found in the plant *Lavandulaofficinalif choix (Fam. Labiate).* Prepared by steam distillation of the flowering stalks of the plant.

SYNS:
LAVENDEL OEL (GERMAN) OIL OF LAVENDER

TOXICITY DATA:	CODEN:
skn-rbt 500 mg/24H MLD	FCTXAV 14,451,76
orl-rat LD50:9040 mg/kg	PHARAT 14,435,59

Reported in EPA TSCA Inventory.

THR: Mildly toxic by ingestion. A skin irritant. When heated to decomposition it emits acrid smoke and irritating fumes. See also 3,7-DIMETHYL-1,6-OCTADIEN-3-OL ACETATE.

LCE000 *HR: 3*
LD-813
CAS: 64083-05-2 NIOSH: OF 6730000

PROP: Commercial mixture of aromatic amines containing approx 40% MOCA.

TOXICITY DATA:	CODEN:
orl-rat TDLo:37 g/kg/2Y-C:CAR	TXAPA9 31,159,75

THR: An experimental carcinogen. When heated to decomposition it emits toxic fumes of NO_x. See also AROMATIC AMINES.

LCF000 *HR: 3*
LEAD
CAS: 7439-92-1 NIOSH: OF 7525000
af: Pb aw: 207.19

PROP: Bluish-gray, soft metal. Mp: 327.43°, bp: 1740°, d: 11.34 @ 20°/4°. vap press: 1 mm @ 973°.

SYNS:

C.I. 77575	OLOW (POLISH)
C.I. PIGMENT METAL 4	OMAHA
GLOVER	OMAHA & GRANT
LEAD FLAKE	SI
LEAD S2	SO

TOXICITY DATA:	CODEN:
cyt-hmn-unr 50 µg/m^3	MUREAV 147,301,85
cyt-rat-ihl 23 µg/m^3/16W	GTPZAB 26(10),38,82
cyt-mky-orl 42 mg/kg/30W	TOLED5 8,165,81
orl-rat TDLo:790 mg/kg (MGN):REP	AEHLAU 23,102,71
orl-rat TDLo:1140 mg/kg (14D pre-21D post):REP	PHMCAA 20,201,78
orl-rat TDLo:1100 mg/kg (1-22D preg):TER	FEPRA7 37,895,78
ihl-rat TCLo:10 mg/m^3/24H (1-21D preg):TER	ZHPMAT 165,294,77
orl-wmn TDLo:450 mg/kg/6Y: PNS:CNS	JAMAAP 237,2627,77
ihl-hmn TCLo:10 µg/m^3:GIT: LIV	VRDEA5 (5),107,81
ipr-rat LDLo:1000 mg/kg	EQSSDX 1,1,75
orl-pgn LDLo:160 mg/kg	HBAMAK 4,1289,35

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,325,80. Lead and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory. EPA Genetic Toxicology Program.

OSHA PEL: TWA 0.05 mg(Pb)/m^3
ACGIH TLV: TWA 0.15 mg(Pb)/m^3
NIOSH REL: TWA (Inorganic Lead) 0.10 mg(Pb)/m^3

THR: Poison by ingestion. Moderately toxic by intraperitoneal route. It is a suspected carcinogen of the lungs and kidneys. Human systemic effects by ingestion and inhalation: loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis and liver changes. The major organ systems affected are the nervous system, blood system, and kidneys. Lead encephalopathy is accompanied by severe cerebral edema, increase in cerebral spinal fluid pressure, proliferation and swelling of endothelial cells in capillaries and arterioles, proliferation of glial cells, neuronal degeneration and areas of focal cortical necrosis in fatal cases. Experimental evidence now suggests that blood levels of lead below 10 µg/dl can have the effect of dimin-

ishing the IQ scores of children. Low levels of lead impair neurotransmission and immune system function and may increase systolic blood pressure. Reversible kidney damage can occur from acute exposure. Chronic exposure can lead to irreversible vascular schlerosis, tubular cell atrophy, interstitial fibrosis, and glomerular sclerosis. Severe toxicity can cause sterility, abortion and neonatal mortality and morbidity. An experimental teratogen. Experimental reproductive effects. Human mutagenic data. Very heavy intoxication can sometimes be detected by formation of a dark line on the gum margins, the so-called "lead line."

When lead is ingested, much of it passes through the body unabsorbed, and is eliminated in the feces. The greater portion of the lead that is absorbed is caught by the liver and excreted, in part, in the bile. For this reason, larger amounts of lead are necessary to cause toxic effects by this route, and a longer period of exposure is usually necessary to produce symptoms. On the other hand, upon inhalation, absorption takes place easily from the respiratory tract and symptoms tend to develop more quickly. For industry, inhalation is much more important than is ingestion. For the general population, exposure to lead occurs from inhaled air, dust of various types, and food and water with an approximate 50/50 division between inhalation and ingestion routes. Lead occurs in water in either dissolved or particulate form. At low pH, lead is more easily dissolved. Chemical treatment to soften water increases the solubility of lead. Adults absorb about 5-15% of ingested lead and retain less than 5%. Children absorb about 50% and retain about 30%.

Lead produces a brittleness of the red blood cells so that they hemolyze with but slight trauma; the hemoglobin is not affected. Due to their increased fragility, the red cells are destroyed more rapidly in the body than is normal, producing an anemia which is rarely severe. The loss of circulating red cells stimulates the production of new young cells which, on entering the blood stream, are acted upon by the circulating lead, with resultant coagulation of their basophilic material. These cells after suitable staining, are recognized as "stippled cells." There is no uniformity of opinion regarding the effect of lead on the white blood cells.

In addition to its effect on the red blood cells, lead produces a damaging effect on the organs or tissues with which it comes in contact. No specific or characteristic lesion is produced. Autopsies in deaths attributed to lead poisoning and experimental work on animals have shown pathological lesions of the kidneys, liver, male gonads, nervous system, blood vessels and other tissues. None of these changes, however, has been found consistently. In cases of severe lead poisoning, the amount of lead found in the blood is frequently in excess of 0.07 mg per 100 cc of whole blood. The urinary lead excretion generally exceeds 0.1 mg per liter of urine.

Flammable in the form of dust when exposed to heat or flame. Moderately explosive in the form of dust when exposed to heat or flame. Mixtures of hydrogen peroxide + trioxane explode on contact with lead. Rubber gloves containing lead may ignite in nitric acid. Violent reaction on ignition with chlorine trifluoride; concentrated hydrogen peroxide; ammonium nitrate (below 200°C with powdered lead); sodium acetylide (with powdered lead). Incompatible with NaN_3; Zr; disodium acetylide; oxidants. Can react vigorously with oxidizing materials. A common air contaminant. When heated to decomposition it emits highly toxic fumes of Pb. See also LEAD COMPOUNDS. For further information, see Vol. 1, No. 1 of *DPIM Report*.

LCG000 ***HR: 3***

LEAD ACETATE

CAS: 301-04-2 NIOSH: AI 5250000

DOT: 1616

mf: $C_4H_6O_4 \cdot Pb$ mw: 325.29

PROP: Trihydrate: colorless crystals or white granules or powder. Sltly acetic odor, slowly effloresces. D: 2.55, mp: 75° (when rapidly heated), decomp above 200°. Very sol in glycerol.

SYNS:

ACETATE de PLOMB (FRENCH)
ACETIC ACID LEAD (2+) SALT
BLEIACETAT (GERMAN)
DIBASIC LEAD ACETATE
LEAD (2+) ACETATE
LEAD(II) ACETATE
LEAD DIACETATE
LEAD DIBASIC ACETATE
NORMAL LEAD ACETATE
PLUMBOUS ACETATE
RCRA WASTE NUMBER U144
SALT OF SATURN
SUGAR OF LEAD

TOXICITY DATA:

	CODEN:
sln-smc 250 µmol/L	MUTAEX 1,21,86
cyt-hmn:lym 1 mmol/L/24H	TXCYAC 10,67,78
mnt-rat-ipr 51800 µg/kg	AEHLAU 40,144,85
otr-rat:emb 200 mg/L	JJIND8 67,1303,81
oms-rat-ipr 10400 µg/kg	AEHLAU 40,144,85
cyt-rat-unr 9 mg/kg/26W-C	GISAAA 49(3),15,84
cyt-rat-ipr 51800 µg/kg	AEHLAU 40,144,85
orl-rat TDLo:600 µg/kg (30D male):REP	AJOGAH 115,1058,73
orl-rat TDLo:1413 mg/kg (1-18D preg):TER	ENVRAL 30,152,83
orl-mus TDLo:236 mg/kg (7-16D preg):TER	ARTODN 41,125,78
orl-rat TDLo:900 mg/kg/60D-C:NEO	ENVRAL 24,391,81
orl-rat TD :250 g/kg/47W-C:ETA	BJCAAI 16,283,62
orl-rat TD :2430 mg/kg/23W-C:ETA	ENVRAL 24,391,81
orl-rat TD :4605 mg/kg/44W-C:ETA	ENVRAL 24,391,81
orl-rat TD :7560 mg/kg/72W-C:NEO	ENVRAL 24,391,81
orl-rat TD :9150 mg/kg/44W-C:NEO	AJPAA4 50,571,67
orl-rat TD :218 g/kg/1Y-C:ETA	BECTA6 23,464,79
orl-rat TD :138 g/kg/76W-C:ETA	TOPADD 13,50,85

TOXICITY DATA:	CODEN:
skn-rbt 500 mg open MLD	UCDS** 4/29/69
orl-rat LD50:20 g/kg	UCDS** 4/29/69

Reported in EPA TSCA Inventory.

THR: Mildly toxic by ingestion. A skin irritant.

NCV500 *HR: 1*

NIAX TRIOL 6000

CAS: 102395-10-8 NIOSH: QR 4600000

TOXICITY DATA:	CODEN:
skn-rbt 500 mg open MLD	UCDS** 6/15/71
orl-rat LD50:57 g/kg	UCDS** 6/15/71

THR: Mildly toxic by ingestion. A skin irritant.

NCW000 *HR: 3*

NIAZOL

CAS: 550-99-2 NIOSH: NJ 4375000

mf: $C_{14}H_{14}N_2 \cdot ClH$ mw: 246.76

SYNS:

ALBALON LIQUIFILM	2-(1-NAPHTHYLMETHYL)-2-IMIDAZOLINE HYDROCHLORIDE
CLERA	PRIVINE HYDROCHLORIDE
COLDAN	PRIZOLE HYDROCHLORIDE
4,5-DIHYDRO-2-(1-NAPHTHALENYLMETHYL)-1H-IMIDAZOLE MONOHYDROCHLORIDE	RHINANTIN
	RHINOPERD
NAPHAZOLINE HYDROCHLORIDE	SANORIN-SPOFA
NAPHCON	STRICYLON
NAPHCON FORTE	VASOCON
2-(1-NAPHTHYLMETHYL)IMIDAZOLINE HYDROCHLORIDE	

TOXICITY DATA:	CODEN:
ipr-rat LD50:50 mg/kg	JPETAB 86,284,46
scu-rat LD50:325 mg/kg	JPETAB 86,284,46
ivn-rat LD50:6 mg/kg	JPETAB 113,341,55
scu-mus LD50:170 mg/kg	JPETAB 86,280,46
ivn-mus LD50:16500 µg/kg	JPETAB 113,341,55
scu-rbt LD50:950 mg/kg	JPETAB 86,284,46
ivn-rbt LD50:800 µg/kg	JPETAB 86,284,46
ims-rbt LD50:950 µg/kg	JPETAB 86,284,46

THR: Poison by intraperitoneal, subcutaneous, intravenous and intramuscular routes. An FDA over the counter and proprietary drug. When heated to decomposition it emits very toxic fumes of NO_x and HCl.

NCW300 *HR: 1*

NICERITROL

CAS: 5868-05-3 NIOSH: QT 1980000

mf: $C_{29}H_{24}N_4O_8$ mw: 556.57

PROP: Crystals. Mp: 160-164°.

SYNS:

2,2-BIS(((3-PYRIDINYLCARBONYL)OXY)METHYL)-1,3-PROPANEDIYL ESTER of 3-PYRIDINECARBOXYLIC ACID	CARDIOLIPOL
	PENTAERYTHRITOL TETRANICOTINATE
BURFOR	PERYCIT
	SK 1

TOXICITY DATA:	CODEN:
orl-rat TDLo:42 g/kg (35D pre):REP	OYYAA2 14,755,77
orl-rat TDLo:45500 mg/kg (91D male):REP	OYYAA2 14,853,77
orl-rat LD50:20 g/kg	NIIRDN 6,546,82
ipr-rat LD50:5000 mg/kg	NIIRDN 6,546,82
scu-rat LD50:5000 mg/kg	NIIRDN 6,546,82
orl-mus LD50:20 g/kg	NIIRDN 6,546,82
ipr-mus LD50:5000 mg/kg	NIIRDN 6,546,82
scu-mus LD50:5000 mg/kg	NIIRDN 6,546,82
orl-dog LD50:5000 mg/kg	NIIRDN 6,546,82
orl-rbt LD50:10 g/kg	NIIRDN 6,546,82
ipr-rbt LD50:5000 mg/kg	NIIRDN 6,546,82

THR: Mildly toxic by ingestion. Experimental reproductive effects. When heated to decomposition it emits toxic fumes of NO_x. See also ESTERS.

NCW500 *HR: 3*

NICKEL

CAS: 7440-02-0 NIOSH: QR 5950000

af: Ni aw: 58.71

PROP: A silvery-white, hard, malleable and ductile metal. D: 8.90 @ 25°, vap press: 1 mm @ 1810°. Crystallizes as metallic cubes. Mp: 1455°, bp: 2730°. Stable in air at room temp.

SYNS:

C.I. 77775	NICKEL SPONGE
Ni 270	Ni 0901-S
NICKEL 270	Ni 4303T
NICKEL (DUST)	NP 2
NICKEL (ITALIAN)	RANEY ALLOY
NICKEL PARTICLES	RANEY NICKEL

TOXICITY DATA:	CODEN:
otr-ham:kdy 400 mg/L	IAPUDO 53,193,84
otr-ham:emb 5 µmol/L	TOXID9 1,132,81
orl-rat TDLo:158 mg/kg (MGN):TER	AEHLAU 23,102,71
scu-rat TDLo:3000 mg/kg/6W-I:ETA	JNCIAM 16,55,55
ims-rat TDLo:56 mg/kg:CAR	IAPUDO 53,127,84
ipl-rat TDLo:100 mg/kg/21W-I:ETA	PWPSA8 16,150,73
par-rat TDLo:40 mg/kg/52W-I:ETA,TER	AEHLAU 5,445,62
imp-rat TDLo:250 mg/kg:CAR	JNCIAM 16,55,55
ims-mus TDLo:200 mg/kg:NEO	NCIUS* PH 43-64-886,SEPT,70
imp-rbt TDLo:165 mg/kg/2Y-I:NEO,TER	JNCIAM 16,55,55
ihl-gpg TCLo:15 mg/m³/91W-I:ETA	AMPLAO 65,600,58
ims-ham TDLo:200 mg/kg/21W-I:ETA	PWPSA8 14,68,71
ims-rat TD :58 mg/kg:ETA	PAACA3 17,11,76
imp-rat TD :23 mg/kg:ETA	JNCIAM 16,55,55
ims-rat TD :125 mg/kg/13W-I:NEO	NCIUS* PH 43-64-886,JUL,68
ims-mus TD :800 mg/kg/13W-I:NEO	NCIUS* PH 43-64-886,JUL,68

ims-rat TD :90 mg/kg/18W-I: ETA	NCIUS* PH 43-64-886,AUG,69
ims-rat TD :889 µg/kg:ETA	JPTLAS 97,375,69
ipl-rat TD :1250 mg/kg/17W-I: ETA	TRBMAV 10,167,52
ipl-rat TD :125 mg/kg/21W-I: ETA	PWPSA8 16,150,73
ims-rat TD :200 mg/kg/21W-I: NEO	PWPSA8 14,68,71
ims-rat TD :1 g/kg/17W-I:CAR	PAACA3 9,28,68
itr-rat LDLo:12 mg/kg	NTIS** AEC-TR-6710
ivn-mus LDLo:50 mg/kg	FATOAO 23,549,60
ivn-dog LDLo:10 mg/kg	14CYAT 2,1120,63
scu-rat LDLo:12500 µg/kg	NTIS** PB158-508
ipr-rbt LDLo:7 mg/kg	NTIS** PB158-508
scu-rbt LDLo:7500 µg/kg	NTIS** PB158-508
orl-gpg LDLo:5 mg/kg	AMPMAR 25,247,64

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 2,126,73; Animal Sufficient Evidence IMEMDT 11,75,76. Reported in EPA TSCA Inventory. Community Right To Know List. EPA Extremely Hazardous Substances List.

OSHA PEL: TWA 1 mg(Ni)/m^3
ACGIH TLV: TWA 1 mg/m^3
NIOSH REL: (Inorganic Nickel) TWA 0.015 mg(Ni)/m^3

THR: Poison by ingestion, intratracheal, intraperitoneal, subcutaneous and intravenous routes. An experimental carcinogen, neoplastigen, tumorigen, and teratogen. Experimental reproductive effects. Ingestion of soluble salts causes nausea, vomiting, diarrhea. Mutagenic data. Hypersensitivity to nickel is common and can cause allergic contact dermatitis, pulmonary asthma, conjunctivitis, and inflammatory reactions around nickel-containing medical implants and prostheses. Powders may ignite spontaneously in air. Reacts violently with F_2; NH_4NO_3; hydrazine; NH_3; (H_2 + dioxane); performic acid; P; Se; S; (Ti + $KClO_3$). Incompatible with oxidants (e.g., bromine pentafluoride; peroxyformic acid; potassium perchlorate; chlorine; nitryl fluoride; ammonium nitrate). Raney-nickel catalysts may initiate hazardous reactions with ethylene + aluminum chloride; p-dioxane; hydrogen; hydrogen + oxygen; magnesium silicate; methanol; organic solvents + heat; sulfur compounds. Nickel catalysts have caused many industrial accidents. For further information, see Vol. 3, No. 3 of *DPIM Report*.

NCX000 **HR: 3**

NICKEL(II) ACETATE (1:2)

CAS: 373-02-4 NIOSH: QR 6125000
mf: $C_4H_6O_4$•Ni mw: 176.81

PROP: Green prisms. Mp: decomp, d: 1.798.

SYNS:
ACETIC ACID, NICKEL(2+) SALT NICKELOUS ACETATE

TOXICITY DATA:	CODEN:
pic-esc 160 µmol/L	ENMUDM 6,59,84
dns-rat-ipr 129 µmol/kg/5D-I	CRNGDP 6,1819,85
otr-ham:kdy 225 mg/L	IAPUDO 53,193,84
ivn-ham TDLo:10 mg/kg (8D preg):REP	ADTEAS 5,51,72
ims-rat TDLo:420 mg/kg/47W-I: NEO	NCIUS* PH 43-64-886,JUL,68
imp-rat TDLo:95 mg/kg/78W-C: ETA	PAACA3 5,50,64
ipr-mus TDLo:360 mg/kg/8W-I: NEO	CNREA8 36,1744,76
ims-rat TD :225 mg/kg/46W-I: ETA	NCIUS* PH 43-64-886,AUG,69
orl-rat LD50:350 mg/kg	PWPSA8 11,39,68
ipr-rat LD50:23 mg/kg	PWPSA8 11,39,68
orl-mus LD50:410 mg/kg	PWPSA8 11,39,68
ipr-mus LD50:32 mg/kg	PWPSA8 11,39,68
scu-gpg LDLo:20 mg/kg	JOHYAY 8,565,08

Nickel and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory.

OSHA PEL: TWA 1 mg(Ni)/m^3
ACGIH TLV: TWA 0.1 mg(Ni)/m^3
NIOSH REL: (Inorganic Nickel) TWA 0.015 mg(Ni)/m^3

THR: Poison by ingestion, intraperitoneal and subcutaneous routes. An experimental neoplastigen and tumorigen. Experimental reproductive effects. Mutagenic data. When heated to decomposition it emits irritating fumes. See also NICKEL COMPOUNDS.

NCX500 **HR: 3**

NICKEL ACETATE TETRAHYDRATE

CAS: 6018-89-9 NIOSH: QR 6126000
mf: $C_4H_6O_4$•Ni•$4H_2O$ mw: 248.89

TOXICITY DATA:	CODEN:
cyt-mus:mmr 100 µmol/L	MUREAV 68,337,79
ipr-mus LD50:45700 µg/kg	RCOCB8 30,133,80

Nickel and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 1 mg(Ni)/m^3
ACGIH TLV: TWA 0.1 mg(Ni)/m^3
NIOSH REL: (Inorganic Nickel) TWA 0.015 mg(Ni)/m^3

THR: Poison by intraperitoneal route. Mutagenic data. When heated to decomposition it emits acrid smoke and irritating fumes. See also NICKEL(II) ACETATE and NICKEL COMPOUNDS.

NCY000 **HR: D**

NICKEL ALLOY, Ni,Be

CAS: 37227-61-5 NIOSH: QR 6126300

SYN: BERYLLIUM-NICKEL ALLOY

IARC Cancer Review: Animal Inadequate Evidence IMEMDT 23,143,80. Nickel and its compounds as well as beryllium and its compounds are on the Community Right To Know List.

THR: Mutagenic data.

ZBA500 *HR: 3*

ZIMELIDINE

CAS: 56775-88-3 NIOSH: UC 6555000

mf: $C_{16}H_{17}BrN_2$ mw: 317.26

SYNS:

(Z)-3-(4'-BROMOPHENYL)-3-(3''-PYRIDYL)DIMETHYL-ALLYLAMINE
3-(p-BROMOPHENYL)-N,N-DI-METHYL-3-(3-PYRIDYL) ALLYLAMINE,
3-(4-BROMOPHENYL)-N,N-DI-METHYL-3-(3-PYRIDINYL)-2-PROPEN-1-AMINE
cis-H 102.09
cis-ZIMELIDINE
(Z)-ZIMELIDINE

TOXICITY DATA:	CODEN:
orl-wmn TDLo:56 mg/kg/14D: GIT,CNS	BMJOAE 285,1009,82
orl-rat LD50:900 mg/kg	DRUGAY 24,169,82
ivn-rat LD50:50 mg/kg	DRUGAY 24,169,82
orl-mus LD50:800 mg/kg	DRUGAY 24,169,82
ivn-mus LD50:60 mg/kg	DRUGAY 24,169,82

THR: Poison by intravenous route. Moderately toxic by ingestion. Human systemic effects by ingestion: muscle weakness, headache and nausea. When heated to decomposition it emits toxic fumes of Br^- and NO_x.

ZBA525 *HR: 3*

ZIMELIDINE DIHYDROCHLORIDE

CAS: 60525-15-7 NIOSH: UC 6555200

mf: $C_{16}H_{17}BrN_2 \cdot 2ClH$ mw: 356.70

SYNS:

(Z)-3-(4-BROMOPHENYL)-N,N-DI-METHYL-3-(3-PYRIDINYL)-2-PROPEN-1-AMINE DIHYDRO-CHLORIDE
H102/09 HYDROCHLORIDE
ZIMELIDINE HYDROCHLORIDE

TOXICITY DATA:	CODEN:
orl-rat TDLo:120 mg/kg (6-17D preg):REP	KSRNAM 17,1833,83
orl-rat TDLo:12 mg/kg (6-17D preg):REP	KSRNAM 17,1833,83
orl-rat LD50:844 mg/kg	APSXAS 20,295,83
ipr-rat LD50:99800 µg/kg	APSXAS 20,295,83
scu-rat LD50:227 mg/kg	APSXAS 20,295,83
ivn-rat LD50:45800 µg/kg	KSRNAM 17,1833,83
orl-mus LD50:341 mg/kg	KSRNAM 17,1833,83
ipr-mus LD50:84400 µg/kg	APSXAS 20,295,83
scu-mus LD50:154 mg/kg	KSRNAM 17,1833,83
ivn-mus LD50:27700 µg/kg	KSRNAM 17,1833,83
orl-dog LD50:271 mg/kg	KSRNAM 17,1833,83
ivn-dog LD50:57 mg/kg	KSRNAM 17,1833,83
orl-cat LDLo:80 mg/kg	APSXAS 20,295,83
orl-rbt LD50:300 mg/kg	KSRNAM 17,1833,83
ivn-rbt LD50:50800 µg/kg	KSRNAM 17,1833,83

THR: Poison by ingestion, subcutaneous, intravenous and intraperitoneal routes. Experimental reproductive effects. When heated to decomposition it emits toxic fumes of Br^-, NO_x and HCl. See also ZIMELIDINE.

ZBJ000 *HR: 3*

ZINC

CAS: 7440-66-6 NIOSH: ZG 8600000

DOT: 1383/1436

af: Zn aw: 65.37

PROP: Bluish-white, lustrous, metallic element. Mp: 419.8°, bp: 908°, d: 7.14 @ 25°, vap press: 1 mm @ 487°. Stable in dry air.

SYNS:

BLUE POWDER
C.I. 77945
C.I. PIGMENT BLACK 16
C.I. PIGMENT METAL 6
EMANAY ZINC DUST
GRANULAR ZINC
JASAD
MERRILLITE
PASCO
ZINC DUST
ZINC POWDER
ZINC, POWDER OR DUST, NON-PYROPHORIC (DOT)
ZINC, POWDER OR DUST, PYRO-PHORIC (DOT)

TOXICITY DATA:	CODEN:
skn-hmn 300 µg/3D-I:MLD	85DKA8 -,127,77
ihl-hmn TCLo:124 mg/m³/50M: PUL,SKN	AHYGAJ 72,358,10

Zinc and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory. EPA Genetic Toxicology Program.

DOT Classification: Flammable Solid; Label: Dangerous When Wet, non-pyrophoric; Flammable Solid; Label: Spontaneously Combustible, pyrophoric

THR: Human systemic effects by ingestion: cough, dyspnea and sweating. A human skin irritant. Pure zinc powder, dust, fume is relatively non-toxic to humans by inhalation. The difficulty arises from oxidation of zinc fumes immediately prior to inhalation or presence of impurities such as Cd, Sb, As, Pb. Inhalation may cause sweet taste, throat dryness, cough, weakness, generalized aches, chills, fever, nausea, vomiting.

Flammable in the form of dust when exposed to heat or flame. May ignite spontaneously in air when dry. Explosive in the form of dust when reacted with acids. Incompatible with NH_4NO_3; BaO_2; $Ba(NO_3)_2$; Cd; CS_2; chlorates; Cl_2; ClF_3; CrO_3; (ethyl acetoacetate + tribromoneopentyl alcohol); F_2; hydrazine mononitrate; hydroxylamine; $Pb(N_3)_2$; (Mg + $Ba(NO_3)_2$ + BaO_2); $MnCl_2$; HNO_3; performic acid; $KClO_3$; KNO_3; K_2O_2; Se; $NaClO_3$; Na_2O_2; S; Te; H_2O; $(NH_4)_2S$; As_2O_3; CS_2; $CaCl_2$; NaOH; chlorinated rubber; catalytic metals; halocarbons; o-nitroanisole; nitrobenzene; non-metals; oxidants; paint primer base; pentacarbonyliron; transition metal halides; seleninyl bromide. To fight fire, use special mixtures of dry chemical. When heated to decomposition it emits toxic fumes of ZnO. See also ZINC COMPOUNDS. For further information, see Vol. 1, No. 7 of *DPIM Report*.

RECORD OF COMMUNICATION (214) 298-6171	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Paul Cooper Environmental Quality Specialist, Texas Water Commission, Duncanville, Texas	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/30/89 Time: 3:15 PM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

He reviews the site for the TWC since last summer. (One 5-hour site visit, he was new at the TWC at the time).

The TWC is the only agency issuing permits for solid hazardous waste. The RCRA Parts A and B are the only permits the TWC issue. The site is a 90 day generator and does not need a permit.

He does not recall any waste spills at the site (either accidental, or from routine site operations). There have been product spills.

There are approximately 2,000 employees at the site.

He does not recall each of the SWMUs which handle the wastes from the source to where it leaves the site, but the waste containment system would prevent any routine spills from releasing to environment ("the containment system is as good as any you will find in the industry").

The TWC District office file is unofficial (official file is in Austin).

The District office site file should be as complete as the Austin TWC file.

It is TWC policy that anything put into the Austin file is photocopied and the copy sent to the District office file.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref. 24

Chevrolet-Pontiac-Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

86-PE-116

September 16, 1986

Mr. Minor Hibbs
Texas Water Commission
P. O. Box 13087
Capitol Station
Austin, Texas 78711

RE: Notification of the Executive Director

Generator: General Motors, CPC Division

Address: 2525 E. Abram Street
Arlington, Texas 76010

TWC Registration: 30347

EPA I.D. Number: TXD008018004

This letter and the supporting attachments is to serve as notification to the Executive Director of the following actions:

1. Intent to close our existing 90-day drum storage area.

2. Submit our closure plan for the activities leading to the closure of our 90-day drum storage area.

3. Intent to construct a new 90-day waste storage area.

Action 1, Notification of Closure:

It is our intent to close our existing hazardous drum storage area which now operates under the Accumulation Time provision of TAC 335.69.

Action 2, Closure Plan:

The plan is attached hereto.

Action 3, Construction Intent:

This is to notify the Executive Director of our intent to construct a drum storage area which will operate under the requirements for Accumulation Time, TAC 335.69. The new proposed drum storage area will replace the drum storage area mentioned in Action 2. The proposed start of construction is to be October 1, 1986, finished October 31, 1986. See Attachment A-1.

Questions concerning the notification actions and closure action should be directed to the writer at 817-649-6350.

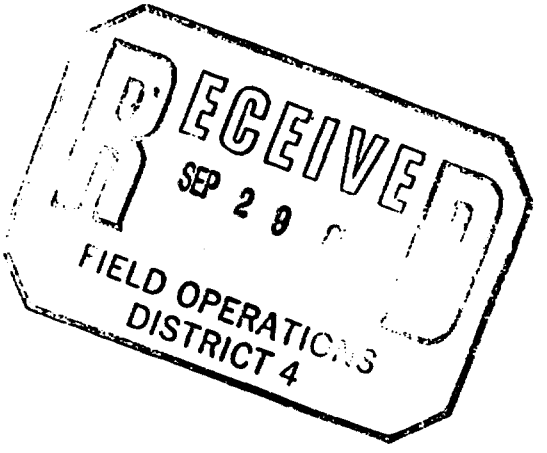
Kent Moon
Environmental Engineer

Attachment
cc: Tim Sewell
Texas Water Commission
203 James Collins Boulevard
Duncanville, Texas 75116-4818

Ref. 25

TEXAS WATER COMMISSION

September 26, 1986



Mr. Gary Giles
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010

Attn.: Kent Moon

Re: TWC Industrial Solid Waste Registration No. 30347
Hazardous Waste Permit Application No. 10411
Full Facility Closure - Affidavit of Exclusion

Dear Mr. Giles:

We have reviewed your letter dated March 13, 1986 transmitting the certifications from the owner/operator that the drum storage area has been closed in accordance with the closure plan approved April 9, 1985. This transmittal, in addition to prior correspondence, completed the requirements for full facility closure for the drum storage area and the equalization lagoon. Our evaluation indicates that the drum storage area and equalization lagoon have been properly certified as closed in accordance with the approved closure plans. We will now resume processing your Affidavit of Exclusion from hazardous waste permitting requirements.

Also, we would like to inform you that recent correspondence from the U. S. Environmental Protection Agency (EPA) has clarified their position on the applicability of 40 CFR Part 264, Subpart F ground-water monitoring requirements to regulated units which close in accordance with the interim status closure requirements (see enclosed correspondence). The correspondence from EPA indicates that "you may be required, depending on the extent of contamination that remains after Part 265 closure, to undertake additional activities at a later date to come into compliance with applicable Part 264 ground-water monitoring and corrective action standards. The final test of whether additional activities will be required is whether the closed unit would have had additional Part 264 ground-water monitoring and corrective action obligation had it closed pursuant to a permit (recall that §3005(i) imposes the same Subpart F requirement on interim status units that they would have had if they had been permitted)."

Therefore, "where the applicant can demonstrate that he has already met the Part 264 'removal or decontamination' standard, no outstanding Part 264 Subpart F requirements would be deemed applicable under §3005(i), and, thus, the Agency would not compel additional activities through a post-closure permit."

Should you have any questions, please contact Rex G. McDonnell III of my staff at AC512/463-8174.

Sincerely,

Minor Brooks Hibbs, Chief
Permits Section
Hazardous and Solid Waste Division

RGM:nlf

cc: Tim Sewell, TWC District 4 Office - Duncanville

Ref. 26

Texas Water Commission

INTEROFFICE MEMORANDUM

TO : Bill Brown, Field Operations Liaison, Hazardous and Solid Waste Division

DATE: January 14, 1986

THRU :

FROM : R. L. Lauderdale, Engineer, District 4

SUBJECT: General Motors Corporation - Arlington, Texas
Registration No. 30347

On December 19, 1985, the writer contacted Kent Moon, Environmental Engineer, and conducted an annual industrial waste compliance inspection of subject facility.

General Motors Corporation of Arlington paints and assembles automobiles to finished units.

All hazardous wastes except paint sludges are collected in drums and stored outside in a diked and fenced area. Drummed waste is sent to Chemical Waste Management, Lake Charles, Louisiana or Lone Mountain, Waynoke, Oklahoma for disposal. Paint thinner is shipped to Ramsey Chemical Company in Valdosa, Georgia for recycling.

Wastewater from paint booth waterfalls is generated at three paint lines. The wastewater is collected in a 40,000-gallon above-ground metal separator tank where solids are settled out. The paint sludge is collected in portable containers which are emptied into 30-cubic yard dumpsters. The supernatant liquid is pumped to a new physical, chemical waste treatment plant. Area around the separator tank is diked and any spillage is collected by a grit separator, thence is pumped to the new wastewater plant.

Portable containers also collect sludge and grit from the separators and thence deposit into 30-cubic yard dumpsters for disposal at permitted sites.

At the new wastewater plant, sludge and filter backwash cake are collected in 30-cubic yard roll-off dumpsters also from off-site disposal. Treated wastewater effluent from new plant is discharged to the sanitary sewerage system.

Closure plans have been submitted for the drum storage area and surface impoundment which has now been replaced by new wastewater plant. Drum storage area was certified closed June 28, 1985 by consulting engineer. The storage area was free of cracks and surface was clean.

Closure of the surface impoundment was about complete at inspection date. Backfill material was satisfactory. Consulting engineer will submit certification of closure January 1986 to central office.

This is reported for your information.

RLL:jc

APPROVED _____ SIGNED R. L. Sandersdale

Ref. 27

Texas Water Commission

INTEROFFICE MEMORANDUM

TO : Files **DATE:** 10/21/88

THRU : Ernest W. Heyer, Chief, Program Services Unit,
Field Operations Division

FROM : Paul Cooper, Environmental Quality Specialist, District 4

SUBJECT: General Motors Corporation - Arlington, Texas
SW Registration No. 30347
CEI Inspection, 9/23/88

On September 23, 1988, the writer contacted Paul Caigoy, Safety Coordinator, and conducted an industrial solid waste compliance evaluation inspection.

The referenced facility paints and assembles automobile components into finished products. The following is a description of wastes that are generated at this site:

1. Approximately 7,800 gallons of waste oil (Waste #008) is generated annually and manifested to LaFarge Corporation in Fredonia, Kansas.

2. Paint sludge (Waste #011) is generated at a grit separator. The grit separator is the first stage of pretreatment of the facility's wastewater. The facility's wastewater consists of spent zinc phosphate solution used in the surface pretreatment of metal automobile parts, and washdown water from the paint booth and various other machinery. Approximately 406 tons of paint sludge are generated annually and manifested to USPCI in Waynoka, Oklahoma.

3. Sodium hydroxide (Waste #012) is used to dissolve paint overspray on the car conveyor racks. Approximately 60,950 pounds are manifested to USPCI each year.

4. Plastics (Waste #014) is generated from excess calking sealer applied to the joints on the automobiles. Approximately 78 tons are manifested to USPCI each year.

5. Paint thinner (Waste #015), generated from the cleaning of paint lines, is stored in two separate 12,000-gallon tanks (Waste Management Facility #02). One tank contains paint thinner too concentrated with paint to be reclaimed and is manifested to LaFarge Corporation. Reclaimable paint thinner is accumulated in the second tank and is manifested to Gibralter Chemical Recyclers in Winona, Texas. Approximately 62,191 gallons are generated each year.

6. Paint stripping sludge (Waste #016) is spent chlorinated solvent used to remove off-specification paint from the automobiles. Approximately 4 drums per year are manifested to LaFarge Corporation.

7. In 1987, 48 cubic yards of asbestos insulation (Waste #018) were manifested to Crow and Son's Landfill in Fort Worth, Texas.

9. Empty containers (Waste #020) are not a waste. They are cleaned on-site and sold for recovery.

10. Contaminated chemical containers (Waste #021) that cannot be cleaned on-site are crushed and manifested to Enzco in Eldorado, Arkansas. Approximately 257 cubic yards are generated each year.

11. Antifreeze (Waste #022) is sold for recovery.

Note that no significant violations of the Texas Hazardous and Solid Waste Regulations were alleged during the inspection.

OTHER AREAS OF CONCERN

The company has submitted a Part "A" Application for two hazardous waste management units, a drum storage area, and an equalization lagoon. Texas Department of Water Resources approved the lagoon closure plan on February 20, 1985. The drum storage closure certification was submitted on October 4, 1985 and the lagoon closure certification was submitted on January 10, 1986. In correspondence of September 26, 1986 from TWC Permits Section, this agency agreed to resume processing the company's Affidavit of Exclusion which was submitted February 14, 1986. The district files do not reflect that the Affidavit of Exclusion has been processed to date. It is recommended that the Affidavit of Exclusion review be completed and the company's Part "A" be withdrawn.

PC:jc

APPROVED _____ SIGNED Paul Cooper

Ref. 28

RECORD OF COMMUNICATION (214) 298-6171	(Record of Item Checked Below) ✓ Phone Call __ Discussion __ Field Trip __ Conference __ Other(Specify)	
TO: Tim Sewell Environmental Quality Specialist, Texas Water Commission, Duncanville, Texas	From: Raymond Wayne FIT Hydrologist	Date: 5/31/89 Time: 11:15AM

SUBJECT G.M. Assembly - PA (TX0008018004)

SUMMARY OF COMMUNICATION

- Old drum storage closed so the company could withdraw Part A application, then new drum area opened. Old drum storage are checked for cracks, cleaned, etc., so the withdrawal request could state the site was clean.
- The equalization lagoon and old drum storage areas were the only RCRA regulated units onsite.
- There is a storage tank used to hold waste paint thinner. Thinner used to clean paint lines in painting areas (purged through paint lines).
- All paint lines waste streams go into the same waste disposal system.
- Tanks inside Paint Mix building.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

RW

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref. 29

DW0550 TEXAS WATER COMMISSION 04-04-89
NOTICE OF REGISTRATION
SOLID WASTE MANAGEMENT

THIS IS NOT A PERMIT AND DOES NOT CONSTITUTE AUTHORIZATION OF ANY WASTE MANAGEMENT ACTIVITIES OR FACILITIES LISTED BELOW. REQUIREMENTS FOR SOLID WASTE MANAGEMENT ARE PROVIDED BY TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TEXAS WATER COMMISSION (TWC). CHANGES OR ADDITIONS TO WASTE MANAGEMENT METHODS REFERRED TO IN THIS NOTICE REQUIRE WRITTEN NOTIFICATION TO THE TWC.

DATE OF NOTICE: 03-03-89 REGISTRATION DATE: 04-12-76

REGISTRATION NUMBER: 30347 EPA I.D. NUMBER: TXD008018004

THE REGISTRATION NUMBER PROVIDES ACCESS TO STORED INFORMATION PERTAINING TO YOUR OPERATION. PLEASE REFER TO THAT NUMBER IN ANY CORRESPONDENCE.

COMPANY NAME: GENERAL MOTORS CORPORATION
MAILING ADDRESS: 2525 EAST ABRAM STREET
ARLINGTON, TEXAS 76010
GENERATING SITE LOCATION:
2525 EAST ABRAM ST, ARLINGTON
CONTACT PERSON: PAUL CAIGOY
PHONE: (817) 652-2373
NUMBER OF EMPLOYEES: GREATER THAN 100
TWC DISTRICT: 04

REGISTRATION STATUS: ACTIVE
REGISTRATION TYPE: GENERATOR
HAZARDOUS WASTE STATUS:
SMALL QUANTITY GENERATOR

I. WASTE GENERATED:

WASTE NUMBER	DESCRIPTION	CLASS	CODE	DISPOSITION
001	GARBAGE	II	280160	OFF-SITE
002	PAPER TRASH	II	280240	OFF-SITE
003	WOOD/LUMBER SCRAP	III	380200	OFF-SITE
004	PLASTICS	III	380270	OFF-SITE
005	FLOOR SWEEPINGS	III	370760	OFF-SITE
006	PLANT WASTES	III	370770	OFF-SITE
007	CONSTRUCTION DEBRIS AND NON-CO	III	370510	OFF-SITE

MBUSTIBLE WASTE

008	OIL, WASTE	I	110450	ON-SITE/OFF-SITE/SOLD FOR RECOVERY
009	PLANT RESIDUES	I	149860	NO LONGER GENERATED
010	BIOLOGICAL SLUDGE, INDUSTRIAL WASTEWATER TREATMENT	I	149890	NO LONGER GENERATED
011	PAINT SLUDGE, OIL AND/OR SOLVENT BASE	IH	950110	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D008			
012	SODIUM HYDROXIDE (NAOH)	IH	970150	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D002, D008, D005			
013	RUBBER	III	380400	OFF-SITE
014	PLASTICS	IH	980270	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D001			
015	PAINT THINNER	IH	910110	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D001, F003			
016	PAINT SLUDGE, PAINT STRIPPING	IH	952000	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D001, F002			
018	ASBESTOS INSULATON	I	179390	ON-SITE/OFF-SITE
019	ZINC PHOSPHATE BATH SLUDGE	I	141710	ON-SITE/OFF-SITE
020	CONTAINERS, EMPTY	I	179450	ON-SITE/OFF-SITE
021	CONTAINERS, CHEMICAL CONTAMINATED	IH	979280	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS):			
022	ANTIFREEZE	I	108320	ON-SITE/OFF-SITE/SOLD FOR RECOVERY
023	DEMINERALIZER RESIN BEADS, SPENT	II	270131	ON-SITE/OFF-SITE

024	ALCOHOLS	IH	918410	ON-SITE/OFF-SITE/SOLD FOR RECOVERY

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D001

025	FILTER WASTES	IH	973340	ON-SITE/OFF-SITE/SOLD FOR RECOVERY

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D008

026	PAINT WASTE, LIQUID	I	110650	ON-SITE/OFF-SITE
027	LINER, CONTAINER, CONTAMINATED	II	279200	ON-SITE/OFF-SITE

II. Shipping/Reporting: Pursuant to Section 335 of the Texas Administrative Code of the rules of the TWC pertaining to Hazardous Waste management, issuance of manifests and annual reporting are required for Off-site Storage/Processing/Disposal of the following wastes listed in Part I. All manifested wastes should be reported on the annual waste summary report and submitted to the TWC by the 25th of each January for the prior calendar year.

In addition for any of the following waste(s) manifested and shipped to Storage/Processing/Disposal facilities <u>in any other state</u> a waste shipment summary is required. All such shipments should be reported on the waste shipment summary report and submitted to the TWC no later than the 25th day of the month immediately succeeding the month in which the shipment was made. No waste shipment summary report is required for months when out of state shipments are not made.

008	110450	OIL, WASTE
011	950110	PAINT SLUDGE, OIL AND/OR SOLVENT BASE
012	970150	SODIUM HYDROXIDE (NAOH)
014	980270	PLASTICS
015	910110	PAINT THINNER
016	952000	PAINT SLUDGE, PAINT STRIPPING
018	179390	ASBESTOS INSULATON
019	141710	ZINC PHOSPHATE BATH SLUDGE
020	179450	CONTAINERS, EMPTY
021	979280	CONTAINERS, CHEMICAL CONTAMINATED
022	108320	ANTIFREEZE

024 918410 ALCOHOLS

025 973340 FILTER WASTES

026 110650 PAINT WASTE, LIQUID

III. ON-SITE WASTE MANAGEMENT FACILITIES:

FAC NO.	FACILITY	STATUS
01	CONTAINER STORAGE AREA STORAGE OF WASTE NUMBER(S) 008, 011, 012, 014, 016, 018, 019, 020, 021, 022, 023, 024, 025, 026	ACTIVE
02	TANK (SURFACE) STORAGE FOR LESS THAN 90 DAYS OF WASTE NUMBER(S) 015 BULK STORAGE TANK, WASTE PURGE THINNER	ACTIVE
03	MISCELLANEOUS STORAGE CONTAINERS STORAGE OF WASTE NUMBER(S) 027 ROLL-OFF BOXES	ACTIVE

UNLESS OTHERWISE STATED ABOVE, FACILITIES ARE LOCATED
AT 2525 EAST ABRAM ST, ARLINGTON
COUNTY OF TARRANT

IV. RECORDS.

A. FOR PURPOSES OF FILING ANNUAL REPORTS PURSUANT TO TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TWC PERTAINING TO INDUSTRIAL SOLID WASTE MANAGEMENT, RECORDS SHOULD BE MAINTAINED FOR STORAGE, PROCESSING AND/OR DISPOSAL OF THE FOLLOWING WASTE(S) LISTED IN PART I:

008 110450 OIL, WASTE

011 950110 PAINT SLUDGE, OIL AND/OR SOLVENT BASE

012 970150 SODIUM HYDROXIDE (NAOH)

014 980270 PLASTICS

015 910110 PAINT THINNER

016 952000 PAINT SLUDGE, PAINT STRIPPING

018 179390 ASBESTOS INSULATON

019 141710 ZINC PHOSPHATE BATH SLUDGE

020 179450 CONTAINERS, EMPTY

021 979280 CONTAINERS, CHEMICAL CONTAMINATED

022 108320 ANTIFREEZE

024 918410 ALCOHOLS

025 973340 FILTER WASTES

026 110650 PAINT WASTE, LIQUID

Ref. 30

Chevrolet-Pontiac-Canada Group
Arlington Plant
General Motors Corporation
2525 East Abram Street
Arlington, Texas 76010-1390

Sept. 23, 1987

Tim Sewell
TWC - Duncanville
203 James Collins Blvd.
Duncanville, TX 75116

Re: Remedial Action Plan Ground Water Clean-up

Dear Sir:

Refinements to the French drain and air stripper have been completed. On Sept. 22, HDR Infrastructure, inspected and approved the system for operation. The drain's collection system currently requires 1 to 2 weeks to accumulate enough water for treatment by the air stripper. Laboratory analysis of the water will be transmitted to your office upon receipt from the lab.

If you have any questions, please call me at 817/652-2373.

Respectively,

Paul Caigoy

Paul Caigoy
Industrial Hygienist

cc B Murday
R Lee
R Sobczynski
C Powell
P Winsborough

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Gary Tarpley, District Supervisor Texas Parks and Wildlife, Fort Worth, Texas (817) 831-3128	From: RW Raymond Wayne, FIT Hydrologist	Date: 5/25/89 11:20 AM
SUBJECT: G.M. ASSEMBLY - PA (TXD008018004)		
SUMMARY OF COMMUNICATION		
The area within 4 miles of the site is urbanized (residential and commercial		
development).		
There are no critical habitats for federally listed endangered species		
within 4 miles of the site.		
There are no sensitive environments within 4 miles of the site.		
CONCLUSIONS, ACTION TAKEN OR REQUIRED		
INFORMATION COPIES TO:		

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Deborah Edris Secretary, Arlington Chamber of Commerce, Arlington, Texas (817) 275-2613	From: RW Raymond Wayne, FIT Hydrologist	Date: 6/5/89 Time: 10:00 AM

SUBJECT: G. M. Assembly - PA (TXD008018004)

SUMMARY OF COMMUNICATION

There are approximately 4,000 employees at the facility.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

TEXAS WATER COMMISSION Ref. 33

April 13, 1989

CERTIFIED MAIL

Ms. Joanne Pritcher
Environmental Supervisor
General Motors Corporation
2525 East Abram St.
Arlington, TX 76010-1390

Re: Subsurface Release of Diesel at the General Motors Assembly Plant, 2525 East Abram St, Arlington (Tarrant County), Texas (LUST ID No. 92803)

Dear Mr. Pritcher:

This Office has been made aware of the above-referenced incident through information provided by a field inspection conducted on April 5, 1989 by John Overman and Richard Clark of our District 4 Field Office in Duncanville. The Texas Water Commission (TWC) is responsible for protecting state waters as well as public health and safety from impacts that may result when a release occurs from an underground storage tank system. Section 26.351(b) of the Texas Water Code requires the owner or operator of an underground storage tank system to immediately abate any releases of a regulated substance and remove the resulting contamination. In order to determine the degree of remediation necessary to address this incident, you are requested to perform a contamination assessment study and provide your findings in a detailed report to this Office. This report must include the following information:

1) A description of the release including the cause, the volume lost, and all measures taken to abate and contain it.
2) A determination of the vertical and horizontal extent of subsurface contamination and an account of the procedures utilized to support this determination. The term "subsurface contamination" includes not only the presence of free product, but also any dissolved-product contamination of groundwater and residual contamination of soils.
3) A site characterization which provides a description of the local soil, geology, and groundwater conditions. If any groundwater is threatened or has already been impacted, you must also provide background water quality information, a water-table gradient map, and a water well inventory. The inventory must locate, on a current

RECEIVED APR 17 1989 DISTRICT 4

U.S.G.S. topographic map, all water wells within a one-half mile radius of the site and provide all available information pertaining to each well. It is also necessary that you provide copies of all State of Texas Water Well Reports (Form No. WWD-012) for any installed monitor wells as is required under the Texas Water Well Drillers Act.

4) A site map drawn to scale indicating the location of the entire underground storage tank system and all nearby buried utilities, structures, and roads. This map should also provide the location of any excavated areas and the collection points for all soil and water samples.
5) Laboratory reports providing the results of all sample analyses and a description of sample collection and analytical procedures. Only EPA-approved methods will be accepted for the collection and analysis of samples utilized to determine waste classifications and final cleanup levels.
6) An account of the disposition of contaminated soils and water, recovered product, or any associated wastes. If wastes are transported off-site for disposal or recycling, copies of signed receipts from the receiving facility as well as any requested uniform hazardous waste manifests must be included.
7) A city or county map depicting the facility's location and photographs documenting observable impacts, excavations, stockpiled soils, and any on-site treatment activities.
8) Finally, based upon the results of the assessment, a proposal for the completion of site remediation.

If any evidence exists indicating the presence of free product accumulation in any monitor wells, the tankhold, piping trenches, etc., immediate removal measures must be implemented. Daily observations should be made and appropriate action pursued to ensure that all free product is continuously removed.

Be advised that TWC approval must be granted before you may initiate any on-site treatment to reduce contaminant levels of affected soils and/or water. Additionally, all vapor emissions that might be associated with this release or your response activities must be controlled and monitored to protect human health and safety.

Please note that you are required to notify Mr. Overman of our District 4 Field Office at 214/298-6171 at least forty-eight (48) hours in advance of conducting any significant on-site investigation or remedial activities including the installation of soil borings and/or monitor wells and excavation work.

We request that the completed site assessment study and remediation proposal be provided to this Office no later than forty-five (45) days from the date of this letter. A copy of your response or any

other correspondence with this Office must be provided to Mr. Overman.

If you have any questions or require guidance regarding this matter, please contact Susie Frizlen of my staff at 512/463-8569. Your cooperation will be appreciated.

Sincerely,

Keith Copeland, Head
Corrective Action Unit
Underground Storage Tank Section

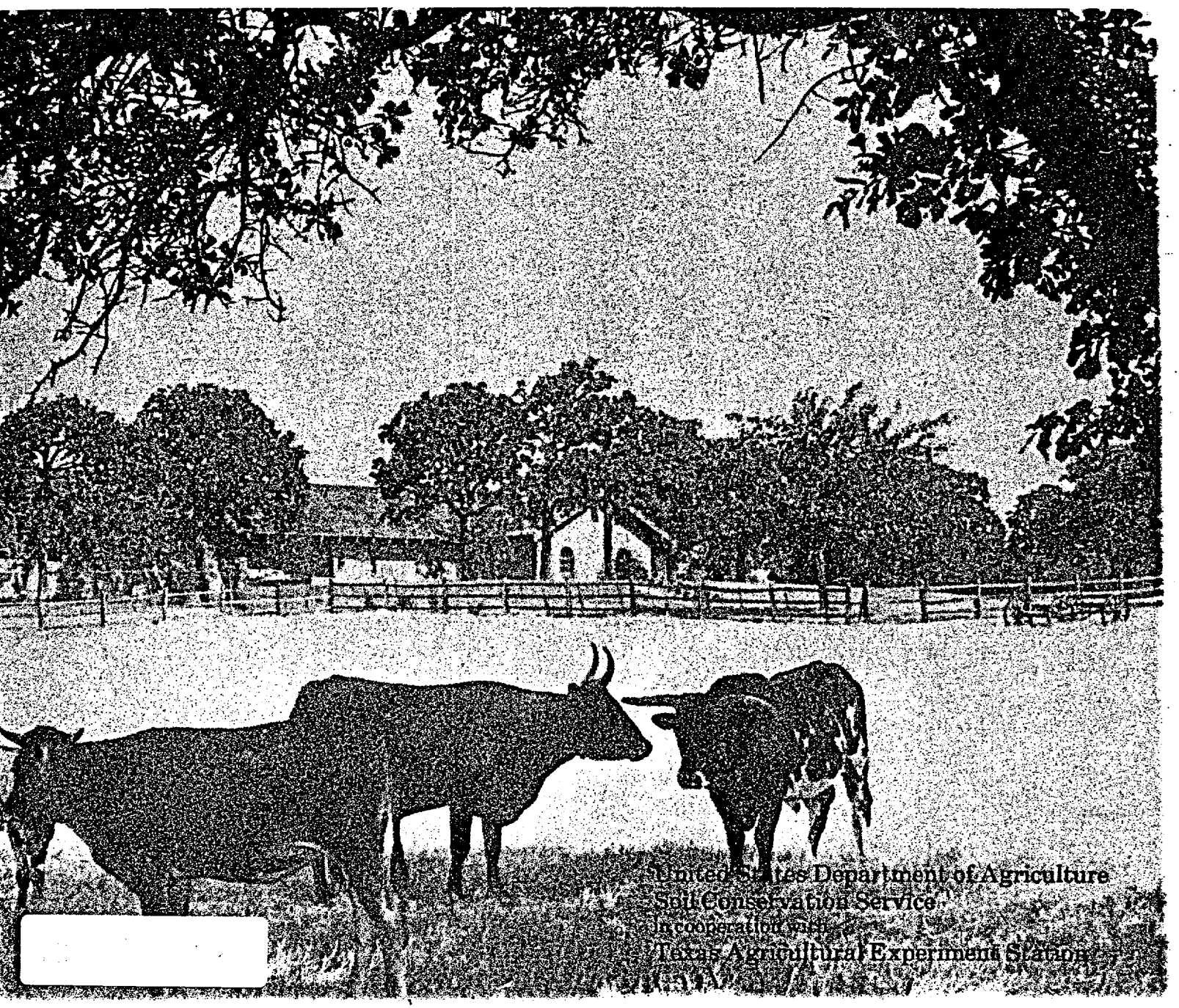
SF/bg
92803.cad

cc: John Overman, TWC District 4 Field Office
(1019 N. Duncanville Road, Duncanville, Texas 75116-2201)

Ref. 34

SOIL SURVEY OF

Tarrant County, Texas



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Texas Agricultural Experiment Station

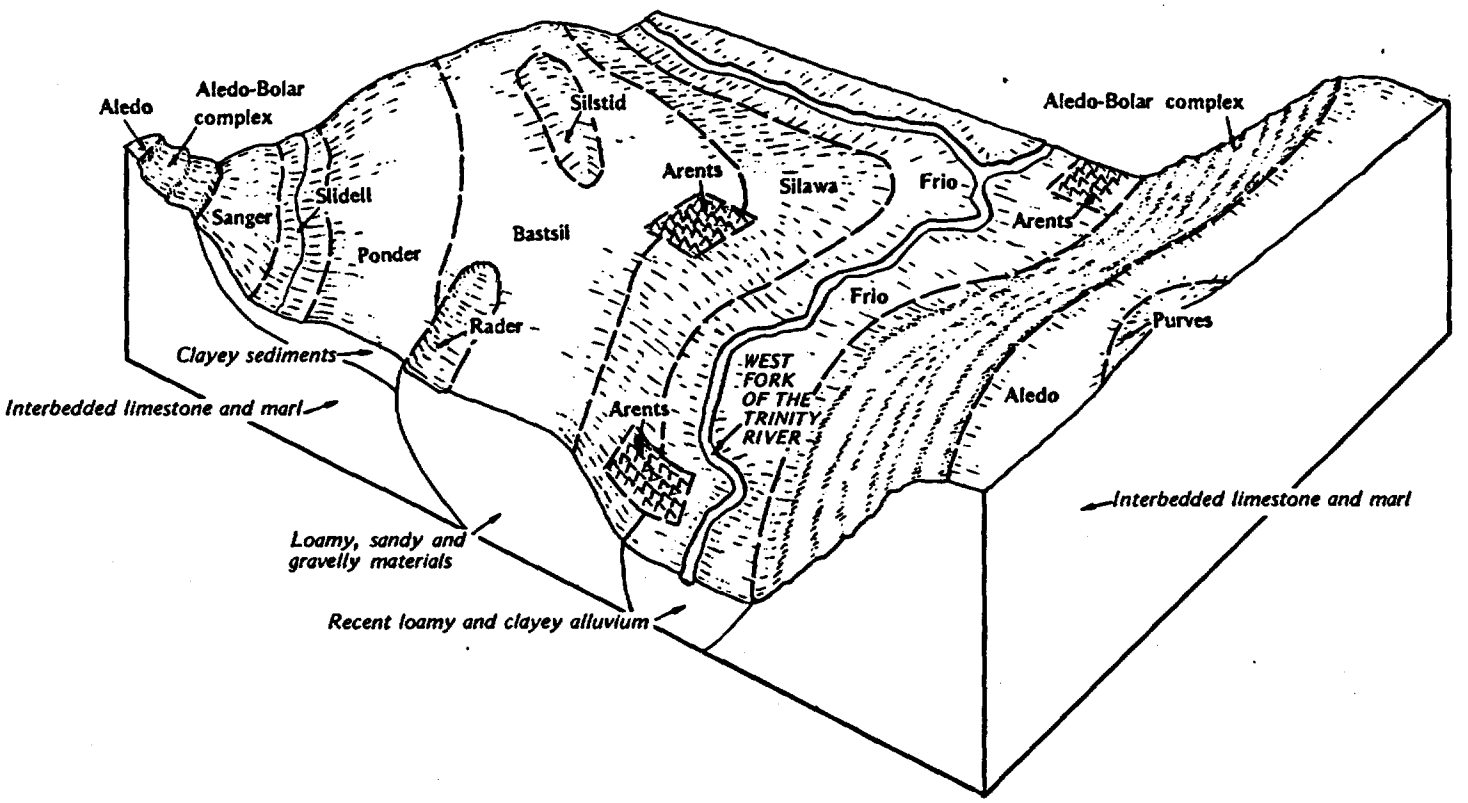


Figure 1.—Typical pattern of soils along the West Fork of the Trinity River. Parts of general soil map units 3, 5, 6, and 7 are represented.

general nature of the county

This section provides general information on the history and settlement, and climate of Tarrant County.

history and settlement

The Tarrant County area was included in Peters' Colony. The first settlement was made about 1840 at Bird's Fort. At that time, this settlement was the western edge of the frontier. In 1841, M.T. Johnson settled at Mary Le Bone Springs, about three miles south of the present Arlington City Hall, and founded Johnson Station. Soon a few other families settled in the area. Sam Houston, the first President of the Republic of Texas, made a treaty with the regional Indians at Bird's Fort in 1843. In 1849, Major Ripley A. Arnold selected a site for a fort on a high bluff overlooking the West Fork of the Trinity River. This fort was named for General William J. Worth.

Tarrant County was formed in 1849 from a northern part of Navarro County and was named for General Edward H. Tarrant. The county was organized in 1850. Birdville, the largest settlement, was made the county seat. The military post at Fort Worth was abandoned in 1853, but the surrounding village grew rapidly. In 1856, after much contesting, the county seat was moved to Fort Worth.

The population of Tarrant County has rapidly increased. It is now the fourth most populated county in Texas.

climate

Table 1 gives data on temperature and precipitation for the survey area as recorded in Tarrant County in the period 1938 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

Tarrant County has a subtropical climate with humid, hot summers. The climate is also continental, characterized by a wide range in annual temperature extremes. Winters are mild, but "northers" occur about three times each month, and often are accompanied by sudden drops in temperature. Periods of extreme cold occasionally occur but are short-lived; so that even in

January, mild weather occurs frequently. In an average year, temperature minima of 20 degrees or below occur on only six days.

The highest temperatures in summer are associated with fair skies, westerly winds, and low humidities. Characteristically, hot spells in summer are broken into three- to five-day periods by thunderstorm activity. There are only a few nights each summer when the minimum temperature exceeds 80 degrees, but a year when the temperature does not exceed 100 degrees is rare.

In winter the average temperature is 47 degrees F, and the average daily minimum temperature is 37 degrees. The lowest temperature on record, which occurred at Fort Worth in February 1899, is -8 degrees. In summer the average temperature is 83 degrees, and the average daily maximum temperature is 94 degrees. The highest recorded temperature, which occurred at Fort Worth on June 26 and 27, 1980, is 113 degrees.

Throughout the year, rainfall occurs more frequently during the night. Usually, periods of rainy weather last for only a day or two, and are followed by several days of fair skies. A large part of the annual precipitation results from thunderstorm activity, with occasional heavy rainfall over brief periods of time. Greatest amounts of rain occur during the months of April and May. July and August are relatively dry months. Thunderstorms occur throughout the year but are most frequent in the spring. Hail falls on about two or three days a year and mostly causes only slight and scattered damage. Windstorms occurring during thunderstorm activity, however, are sometimes destructive.

The total annual precipitation is 32.1 inches. Of this, 19 inches, or 59 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 11 inches. The heaviest 1-day rainfall during the period of record was 9.57 inches at Fort Worth on September 1932. Thunderstorms occur on about 44 days each year, and most occur in spring.

The average length of the warm season (freeze-free period) is 249 days. Since 1940, the longest freeze-free period was 292 days in 1973, and the shortest was 196 days in 1946. The average date of the last occurrence of 32 degrees or below is March 16. During the period 1940-1970, the earliest occurrence was February 14, 1946, and the latest was April 13, 1957. The average date of the first occurrence of 32 degrees or below in the fall is November 21. During the period 1940-1970, the earliest occurrence was October 27, 1957, and the latest was January 4, 1972.

Snowfall is common. In 72 percent of the winters, there is measurable snowfall. In 23 percent, the snowfall, usually of short duration, is more than 5 inches. The heaviest 1-month snowfall on record was more than 12 inches.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines 76 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 14 miles per hour, in March and April.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland managers, engineers, planners, developers and builders, home buyers, and others.

This complex is not in a capability subclass or range site.

80—Trinity clay, frequently flooded. This deep, nearly level, clayey soil is on flood plains of major streams. It is flooded once every year to once every two years. Flooding lasts from several hours to one day. Areas are long and broad and parallel the stream channel. They range from 20 to about 1,500 acres. Slopes range from 0 to 1 percent.

Typically, this soil is moderately alkaline, dark gray clay to a depth of 63 inches. It has very dark grayish brown mottles below a depth of 32 inches.

This soil is somewhat poorly drained. Permeability is very slow, and available water capacity is high. Runoff is very slow, and the hazard of erosion is slight. When the soil is dry, deep, wide cracks form at the surface. Water ponds on the surface for a few hours following rains. The root zone is deep, but plant roots slowly penetrate the clayey material.

Included with this soil in mapping are small areas of Ovan soils and areas of Trinity soils that have as much as 10 inches of dark grayish brown overwash deposited on the surface. The included soils make up as much as 30 percent of a mapped area.

This soil is used mainly as pastureland and is well suited to this use. Adapted pasture plants commonly grown are improved bermudagrass, tall fescuegrass, indiangrass, switchgrass, kleingrass, johnsongrass, sweetclover, and singletary peas. Fertilization, weed control, and controlled grazing are pasture management objectives.

The hazard of flooding is the main limitation for use as cropland and for urban and recreation uses. This limitation can be overcome only by major flood control. Wetness, very slow permeability, and the clay texture throughout that causes deep, wide cracks to form when the soil is dry and causes stickiness when the soil is wet are also limitations for urban and recreation uses.

Areas of this map unit are excellent for wildlife habitat. These areas furnish cover, food, and nesting for many songbirds, quail, doves, rabbits, squirrels, raccoons, and deer.

This soil is in capability subclass Vw and the Clayey Bottomland range site.

81—Urban land. This unit consists of areas that are 85 to 100 percent works and structures, such as office buildings, hotels, railroad yards, airports, multiple-unit dwellings, shopping centers, churches, schools, streets, sidewalks, and paved parking lots. Most of the sales, service, banking, professional, educational, entertainment, and governmental functions of the cities are concentrated in these areas.

Most of the rainfall in those areas runs off and reaches major drains rapidly.

Included in mapping are some built-up areas on which buildings and structures cover less than 85 percent of the surface. Also included are small areas of soils that have been covered by fill material. These included areas make up as much as 20 percent of the mapped areas.

The soils that make up Urban land have been altered and obscured to the extent that they can not be classified.

This map unit is not in a capability subclass or range site.

82—Weatherford fine sandy loam, 3 to 8 percent slopes. This deep, gently sloping and sloping soil is on slopes above drainageways. Areas follow the contour of slope and are longer than they are wide. They range from 10 to about 120 acres. Slopes are convex and average about 5 percent.

Typically, the surface layer is brownish fine sandy loam about 6 inches thick. The subsoil, from a depth of 6 to about 51 inches, is sandy clay loam. It is reddish in the upper part and yellowish in the lower part. Below that is stratified pink and white packsand and weakly cemented sandstone. Reaction typically is neutral in the upper part of the soil and medium acid in the lower part.

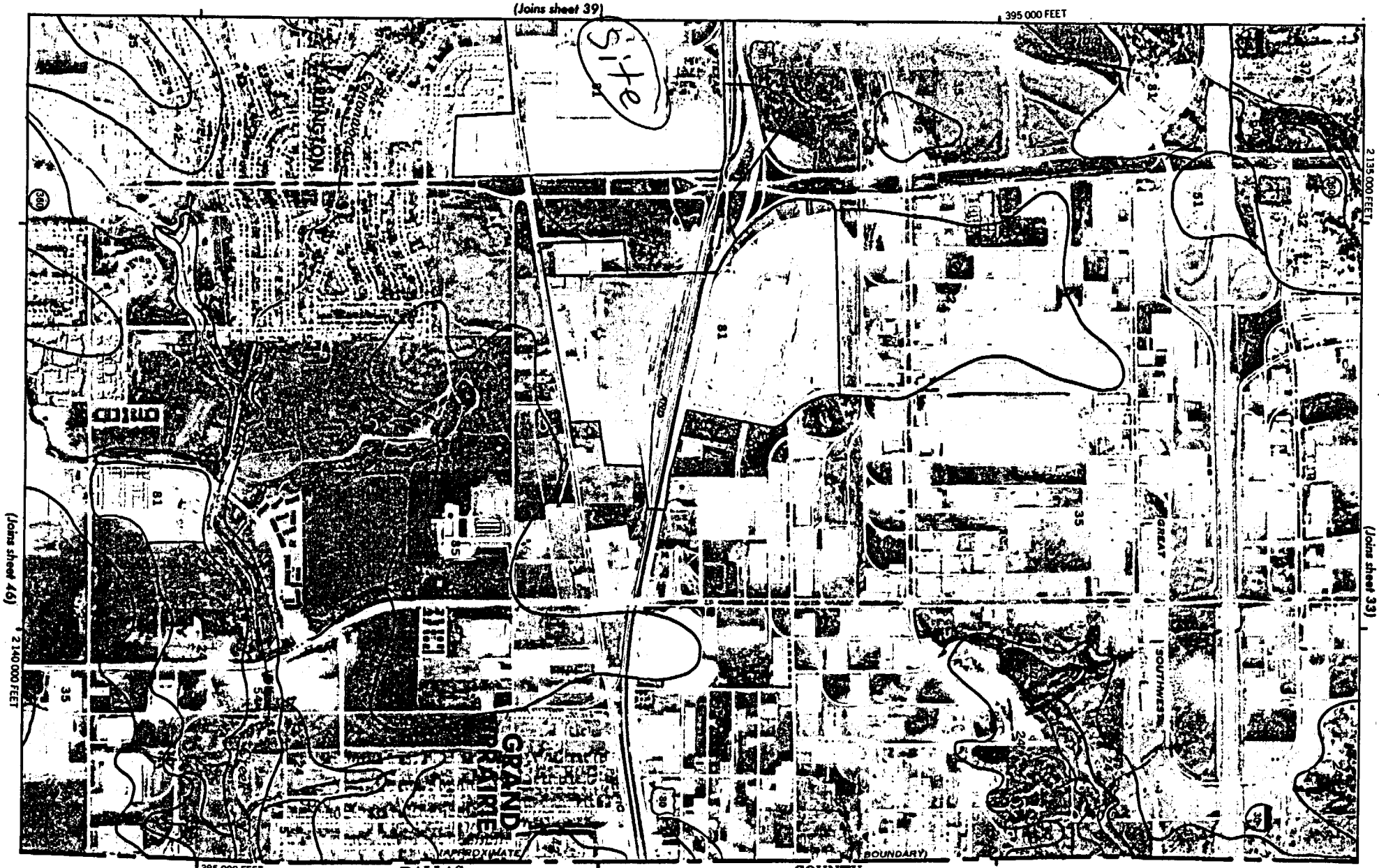
This soil is well drained. Permeability is moderate, and available water capacity is medium. Runoff is medium, and the hazard of erosion is severe. Areas that are bare of vegetation are subject to soil blowing. This soil is easy to work throughout a wide range of moisture conditions. The root zone is deep, and plant roots can easily penetrate the lower layers.

Included with this soil in mapping are small areas of Selden soils on lower slopes and Windthorst soils on upper slopes and ridges. A few areas of eroded Weatherford soils, from which most of the surface layer has been removed, are included. A few uncrossable gullies are present in some areas. These included soils make up as much as 20 percent of any mapped area.

This Weatherford soil is mainly used as pastureland and rangeland. It is moderately suited to use as pastureland. Improved bermudagrass, kleingrass, weeping lovegrass, indiangrass, switchgrass, vetch, and arrowleaf clover are commonly grown. Proper pasture management includes fertilization, weed control, and controlled grazing.

This soil is moderately suited to use as cropland. Low natural fertility and runoff are limitations for production. Management concerns are controlling water erosion and soil blowing and improving soil tilth. Terracing and farming on the contour help to slow runoff and to reduce erosion. Grassed waterways are needed to stabilize terrace outlets. Leaving crop residue on the surface and growing cool season legumes help to slow runoff, improve soil tilth, and control soil blowing.

The Weatherford soil is well suited to most urban and recreation uses. Low strength affecting streets and roads and slope are the main limitations. Good design and careful installation can easily overcome these limitations. Areas left bare of vegetation during construction are easily erodible. Slope is a limitation for using this soil for playgrounds.



1 ¾ ½ ¼ 0 1 Mile

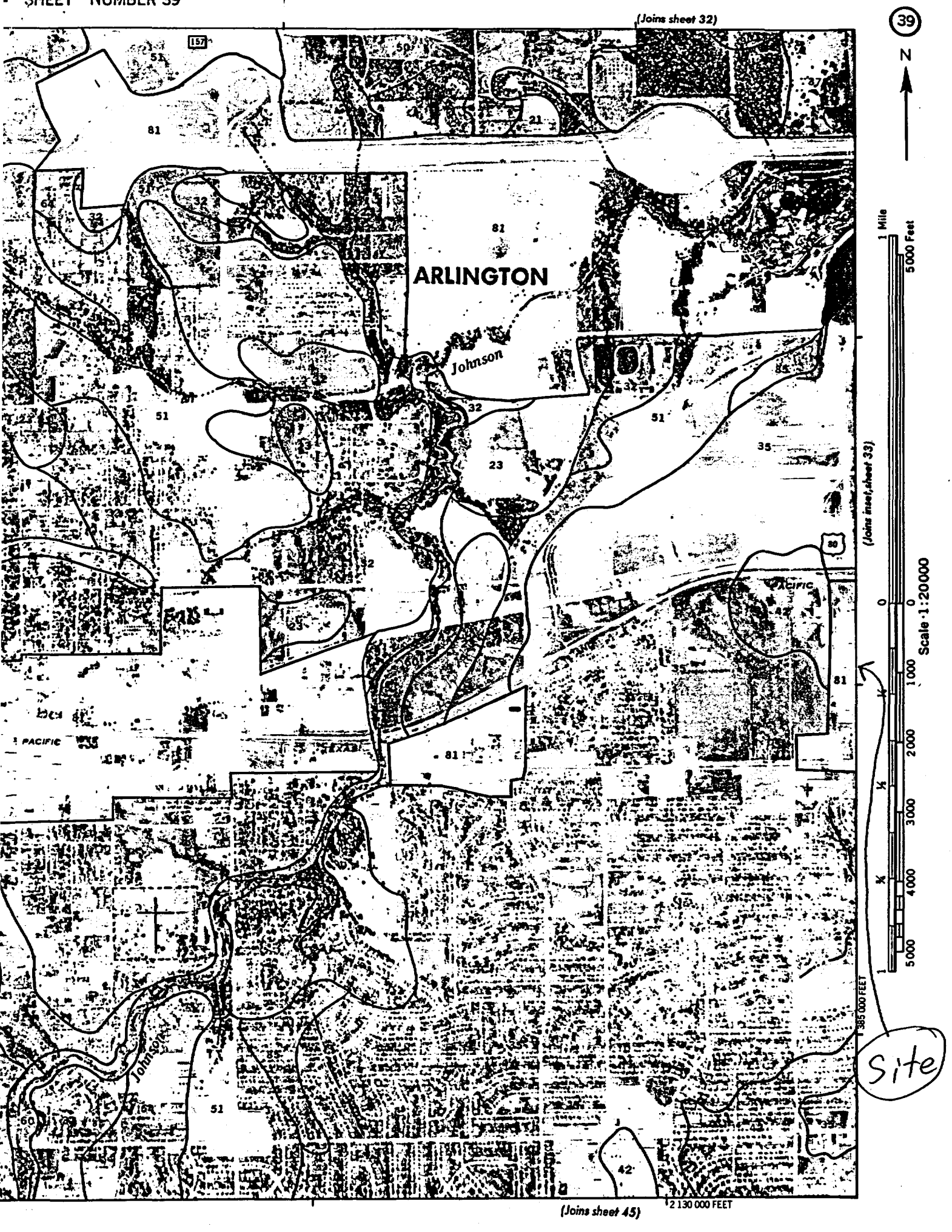
5000 4000 3000 2000 1000 0 5000 Feet

N

(33)

AS – SHEET NUMBER 33

- SHEET NUMBER 39



Ref. 35 498

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 cha inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program
(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER: F T X D 0 0 8 0 1 8 0 0 4 | 3 | D

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the Instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X	
D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the Instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the Instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

3 | SKIP | GMC GM ASSEMBLY DIVISION ARLINGTON PLANT

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title) | B. PHONE (area code & no.)

2 | MILLER, RONALD PLANT ENGINEER | 817 | 649 | 6350

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 | 2525 EAST ABRAM

B. CITY OR TOWN | C. STATE | D. ZIP CODE

4 | ARLINGTON | TX | 76010

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 | 2525 EAST ABRAM

B. COUNTY NAME

TARRANT

C. CITY OR TOWN | D. STATE | E. ZIP CODE | F. COUNTY CODE (if known)

RECEIVED
NOV 19 1980

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST	B. SECOND
3711 (specify) Automobile Assembly	(specify)
C. THIRD	**D. FOURTH**
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME

GMC GM ASSEMBLY DIVISION ARLINGTON PLANT

B. Is the name listed in Item VIII-A also the owner? ☒ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other", specify.)*

F = FEDERAL M = PUBLIC *(other than federal or state)*
S = STATE O = OTHER *(specify)*
P = PRIVATE

P (specify)

D. PHONE *(area code & no.)*

A 817 649 6350

E. STREET OR P.O. BOX

2525 EAST ABRAM

F. CITY OR TOWN | **G. STATE** | **H. ZIP CODE**

ARLINGTON | TX | 76010

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	D. PSD *(Air Emissions from Proposed Sources)*
N NA	P NA
B. UIC *(Underground Injection of Fluids)*	**E. OTHER** *(specify)*
U NA	S 03047 (specify) Texas Solid Waste Disposal Act
C. RCRA *(Hazardous Wastes)*	**E. OTHER** *(specify)*
R NA	S TA0157I (specify) Texas Air Control Board

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements. F9: A/50

XII. NATURE OF BUSINESS *(provide a brief description)*

Assembly of automobiles and light trucks from components furnished by other divisions. Assembly operations include welding, cleaning processes, sealing, painting and assembly.

F9: A/51

XIII. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
P. J. Coletta - GM Assembly Division Vice-President and General Manager	P J Coletta	11/17/80

COMMENTS FOR OFFICIAL USE ONLY

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 char/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

F	T	X	D	0	0	8	0	1	8	0	0	4	3	1

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS
A	80 11 19	

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

C	YR.	MO.	DAY
8	53	01	05

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR.	MO.	DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
~~X 1~~	~~S 0 2~~	~~600~~	~~G~~		5				
~~X 2~~	~~T 0 3~~	~~20~~	~~G~~		6				
1	S 0 1	92,400,000	G		7				
2	S 0 2	350,000.000	G		8				
3	T 0 1	750,000.000	U		9				
4	T 0 2	750,000.000	U		10				

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. **EPA HAZARDOUS WASTE NUMBER** — Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. **ESTIMATED ANNUAL QUANTITY** — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. **UNIT OF MEASURE** — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	200	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2	recycled paper			ecology and environment included with above

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)														T/A	C
W	T	X	D	0	0	8	0	1	8	0	0	4		3	1

FOR OFFICIAL USE ONLY														T/A	C						
W	D	U	P												2	D	U	P			

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F002	.100	T	S01	
2	F003	6.100	T	S01	
3	F005	1.200	T	S01	
A04	F006	315.000	T	T02 S01	
A04	~~F018~~				Included with above
6	F007	15.000	T	T01 S02	
7	F008	15.000	T	T01 S02	
8	F009	15.000	T	T01 S02	
9	~~F017~~	200.000	T	T01 S02	
10	D002	170.000	T	S01	
11					
12					
13					
14					
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17					
18					
19					
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22					
23					
24					
25					
26					

CONTINUE ON REVERSE

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

F	T	X	D	0	0	8	0	1	8	0	0	4	T/A 3	C 6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).* F6. 55

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground–level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).* F6. A/56

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
32 44 56 N	097 04 19 W

VIII. FACILITY OWNER

☒ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
J. J. Coletta - GM Assembly Division Vice-President and General Manager	J. J. Coletta	11/17/80

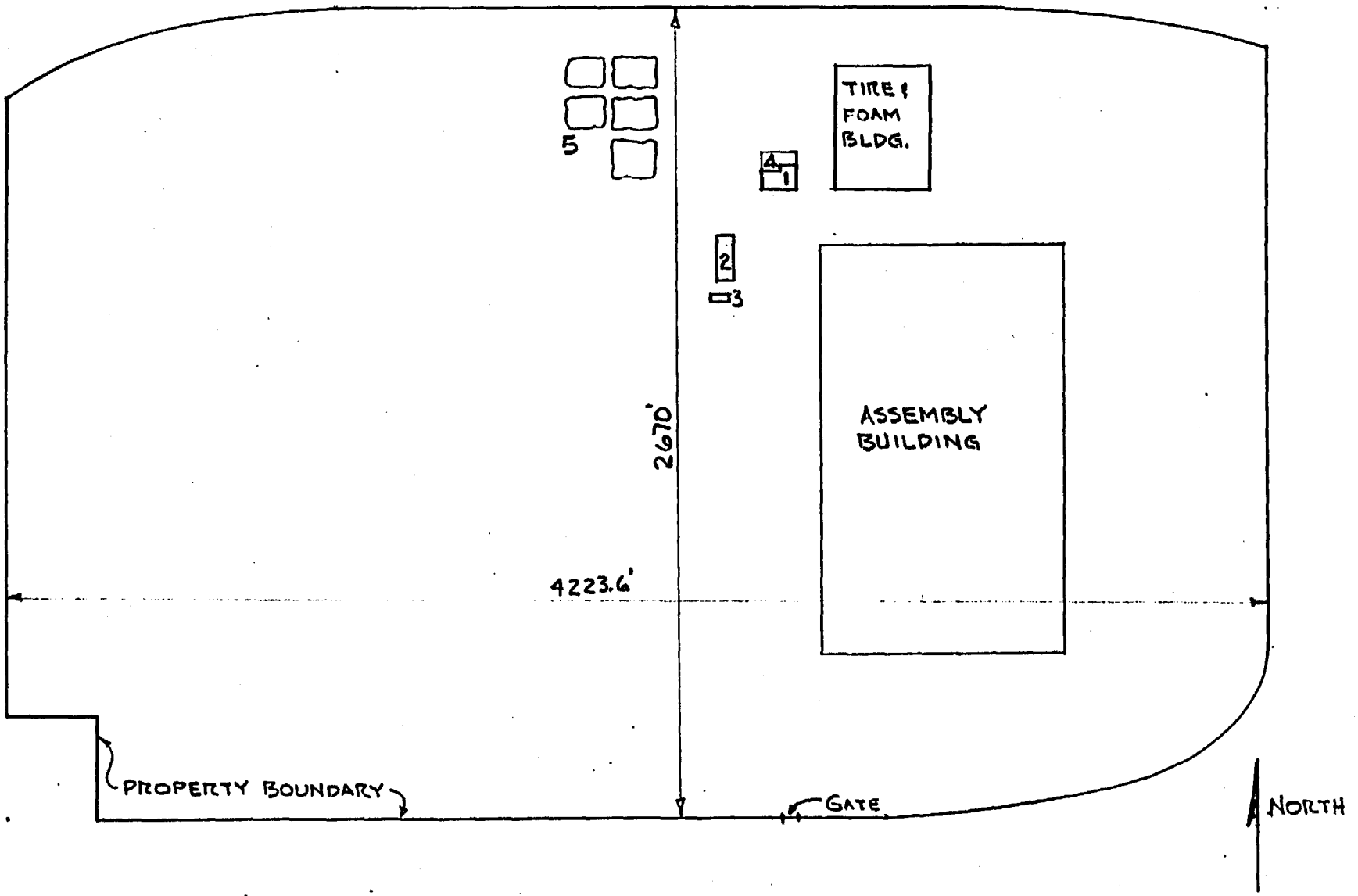
X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED

V. FACILITY DRAWING *(see page 4)*

1. PAST INCINERATOR 80'x120' NO LONGER USED
2. SLUDGE HOLDING TANK 50'x150'
3. GRIT SEPARATOR 30'x 60'
4. DRUM STORAGE AREA 30'x 120'
5. PAST SLUDGE DRYING BEDS APPROX. 300'x400' TOTAL



TxDOT

[illegible] BASIN [illegible]

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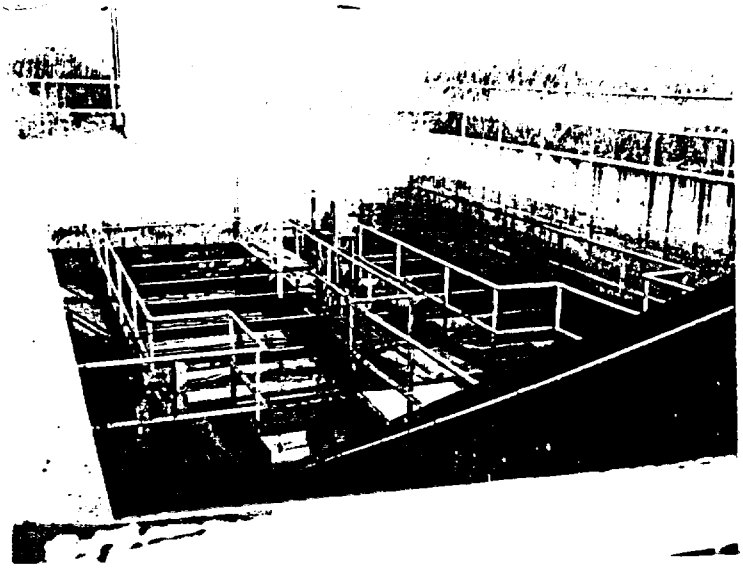
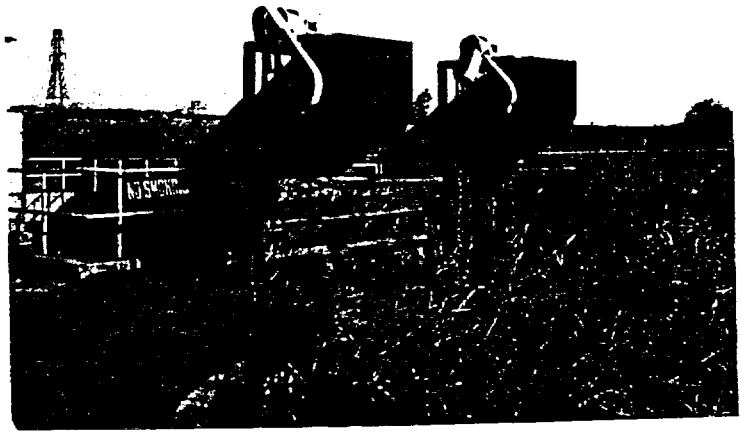


DUPLEX GRIT SEPARATORS



GRIT SEPARATOR CONVEYOR DUMP INTO GONDOLAS